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ABSTRACT

This report presents data concerned with: (1) the feasibility of a home-based instructional program for disadvantaged 4 and 5 year old children in Israel, administered by non-professional aides, and (2) the effectiveness of such a program as reflected in (a) the academic and intellectual gains of children involved, and (b) the spill-over effects to other members of the family and community. The program incorporated mothers, non-professional aides, a professional coordinator, a director, kindergarten teachers and the use of structured materials. The effectiveness of the program was examined under varying conditions: locus and duration of instruction, and point of entry into the program. The locus of instruction was either the child's home or the child's kindergarten class. Comparison of intellectual and academic achievement scores for the three groups (home instruction, teacher instruction, uninstructed controls) indicated that the home instruction treatment was the most effective of the three. Evaluation of spill-over effects in the community was based on spontaneous on-going reports of all participants. From these it was evident that there had been some impact on the community. (Author/EB)

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HOME INSTRUCTION PROGRAM FOR PRESCHOOL YOUNGSTERS

(HIPPY)

Final Report, 1973

Avima D.Lombard, Project Director

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Working in a field project can be exhausting and frustrating, as well as satisfying. For their persistence and involvement in putting the program into action we thank the aides. We are especially indebted to Ms. Penina Padan, for her successful coordination of all aspects

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Avima Lombard,
Project Director

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INTRODUCTION

Universal preschool education is no longer a dream for the distant future. The demands of our technological society have brought an awareness of the deficiencies in educational achievement of too many of our children, especially those from poverty areas. To help combat such deficiencies, formal preschool settings for increasingly younger age groups are suggested as ways of overcoming the disadvantage with which these children enter kindergarten. While the extra year or more of schooling might be considered good therapeutic planning, there is evidence that more than formal schooling is needed.

One of the significant findings of the Coleman report was that the main source of variance in pupils' achievement was neither the curriculum nor the school, but the background from which the pupils came (Coleman, 1966). Though striking at the time this finding was not entirely unexpected. The family is the prime educating force from the moment of birth, and although formal schooling is introduced early in most western cultures, the impact of studying away from home for four to eight hours daily for ten months in a year can hardly be more forceful than the combination of affect and cultural patterns provided at home.

The problem of children's educational performance deficits should therefore be considered as much a home problem as a school problem. During the past decade we have observed many school intervention programs aimed at narrowing, if not closing, the gap between the educational achievement of children from socially advantaged and disadvantaged backgrounds. Widely varying approaches were used, with equally widely varying degrees of reported success. A common problem faced by all, however, seems to have been the tendency for children who showed good gains as the result of preschool intervention programs to lose these gains after a year or two in the regular school setting.

The primary objective of our research was to examine the effects of a highly-structured sequential program on intellectual and academic functioning in socially-disadvantaged young children. The program involved aspects of problem solving, language enrichment, "meta" learning and motivational enrichment, and was designed so as to engage the children in short, daily lessons throughout the school year.

The effects of this program were examined with two major variations. With one group of children the program was administered by the mothers of the children in their homes, under the guidance of non-professional indigenous aides, while the other group of children was taught by their nursery school and kindergarten teachers using the program in the regular preschool classroom setting. A comparison of the effects of the intervention program when the matrix of instruction is in the home as against the school and is administered by non-professional teachers constituted the second objective of our research.

The research reported herein represents four years of field research and as such deals with several secondary, practical variations relating to the implementation of the program. In addition to investigating the feasibility of the techniques and the program as a whole, it was possible to test the effects of varying the ages of entry into the program and also of varying the duration of instruction.

All groups were tested at regular intervals during the program and one year after its completion, during which time none of the children had contact with the program. Yearly testing will continue so as to examine the lasting effects of treatments. This question is especially critical in the light of recent findings which indicate that effects of intervention programs tend to vanish after a year or two of regular schooling.

Finally, we have gathered information on several of the peripheral effects of the experimental program. Changes in the attitudes of the parents involved, the impact on the aides and their own families, spillover effects to siblings of the children and the effects of the program on the local community are some of the subjects which received initial examination and which we hope to study more intensively in continued research.

THEORETICAL BACKGROUND

The choice of setting, implementation and content incorporated into HIPPY (Home Instruction Program for Preschool Youngsters) has emerged from various recent developments reported in the literature, which seems to indicate the suitability of this type of program for education of the disadvantaged.

Home Environment

Home environment is receiving increasing attention as an important influence on ultimate intellectual development. Coleman's (1967) conclusion that "the school appears unable to exert independent influences to make achievement levels less dependent on the child's background", (p.297) confirmed the need for major consideration of the home in planning for the education of the disadvantaged.

Gross (1970) found that the degree of education-mindedness of the home is so related to a child's academic achievement that the pattern of school achievement through eighth grade is set before the child reaches first grade. McIntire (1971) claims that the predictive power of intra-family functioning as characterized by social relationships is at least equal to that of IQ in predicting school achievement. Certainly knowledge of the impact of at least one facet of family functioning - the mother's role as teacher - contributes toward the development of this trend in educational thought. In this context Scheinfeld et al (1970) attempted to promote the child's competence by introducing changes in that aspect of the family environment which deals with parent-child relationships. Through intense mother interviews and directive constructive play, they brought about significant changes in the mother's view of herself as an agent furthering her child's development and in her own sense of self-worth. Children appear to gain a learning advantage in any situation where the mother works with her child. In three differently structured series of instructional sessions which mothers attended with teachers over a period of 12 weeks, in order to improve their intellectual interaction with their young children, Boger et al. (1969) found no one group to be consistently superior to the others; all children benefited from the increased interaction with their mothers.

Similar implications are to be drawn from Gilmer et al. (1970) who found that the effects of three differently structured preschool programs varied with mother's active participation. Children whose mothers were also involved in the program scored significantly higher on Binet measures than children with older siblings involved but not the mother.

Mother's Teaching Style: Social Class Differences

Both child-rearing practices and attitudes to education have been found to be major factors which discriminate between middle-class and lower-class families (Newson, 1968).

The mother as a teacher is in a position to manipulate two processes (Gray, 1971). She controls stimulus events and she controls rewards. Distinct social class differences in these two areas relate to very differential functioning of the mother as educator.

Whereas middle class mothers typically adopt an educative role in the home and use it to support and further the child's intellectual growth and school experience, lower class mothers do not. The latter may be equally concerned about their children (McCarthy, 1969) but while they value education in general, they mistrust schools (Riessman, 1966) and are apparently both unable to and pessimistic about being able to help their children towards school success.

The lower class home is characterized by a pattern of life which appears to be dysfunctional for the child's school experience: the mother shows a more controlling, irritable and punitive approach towards her child (Bayley & Schaefer, 1960), the characteristic language pattern is not geared to serving school achievement (Bernstein, 1960), and mothers do not provide their children with the kinds of information essential for problem-solving. Hess and Shipman (1965) consider the absence of meaning to be a prime factor in the educational disadvantage of lower class children. Mothers whom they observed in a teaching situation not only provided minimal information for problem solving, but frequently failed even to explain to the child what was expected of him. Such deficiencies were suggested to be directly related to lower class children's inability to solve problems as well as to verbalize ideas and describe events.

Brophy (1970) proposes that SES differences in maternal teaching are not describable in terms of two contrasting styles but instead represent variations from limited, primarily reactive teaching to more diversified, proactive teaching. It is thus suggested that SES differences would be greatest in activities initiated and structured by parents and least in reactive situations in which the parent is responding to overt action by his child.

Such an example is that of Olmsted and Jester (1972) who gathered their information from a block-sorting teaching task. Using a sample of 39 middle SES and 32 lower SES mothers and their 5 - 8 year-old children, they found a number of class differences in teaching techniques used. Middle SES mothers gave their children more practice on the task, made more corrections accompanied by reasons and used more positive control strategies. They also spent more time teaching, spent more time talking (as did their children) and used a greater variety of speech. They used significantly more praise and asked more open questions and fewer closed questions. This style of question asking was found to produce greater quantity of verbal response from the children (Paynton, 1972).

Bee et al. (1969) support these findings and add that the middle class mother's teaching characteristics also include offering less criticism, intruding less into the task performance and making less specific suggestions. Hess and Shipman's (1968) now classic studies indicate that the middle class teaching technique is associated with greater cognitive development of the child. Home-instruction programs with disadvantaged populations typically attempt to teach such middle class techniques to the mothers involved.

Tulkin and Kagan (1970) set out to identify the source of perceived social class differences in mother-child interactions, and studied mothers and their infants in the first year of life. Social class differences were related to the mother's concept of what her infant is like. Working-class mothers tended to believe that their infants do not possess the ability to feel adult-like emotions. They also perceived themselves as having less influence on their child's development. Middle-class mothers respond more verbally and more quickly to a higher percentage of their infants' fretting, indicating a different approach to the child's needs.

An interesting attempt to find nonverbal correlates of the middle class mother-child communication pattern was made by Hore (1970). He observed that lower class mothers and their preschool children used more physical contact during the performance of a practical task while the middle class dyad exchanged more mutual glances.

Home Instruction Programs

In the past decade several different kinds of home instruction programs have been initiated. The Ypsilanti Intervention Programs included parent instruction under various conditions. Weikart and Lambie (1968) reported significant success in effecting changes on Stanford-Binet IQ scores following weekly 1½-hour meetings with the mothers,during which individualized education programs for mother and child were suggested and discussed.

Radin (1969) reported concern about the trend for children to lose gains achieved in preschool intervention programs. They devised a follow-up program for the children who excelled in the preschool programs. While all the children continued to attend regular kindergarten, one-half of those selected for the follow-up experiment also attended special classes after the regular kindergarten sessions. The other experimental group attended these extra sessions and, in addition, their mothers were visited bi-weekly by an experienced home counselor, who suggested ways by which the mother might improve the child's cognitive functioning.

All the children continued to grow intellectually in kindergarten. But contrary to expectation, only one of the experimental groups seemed to have shown increased benefit from the supplementary treatment. The children who had extra instruction but no home visits did no better than those who had no extra instruction. Those children whose mothers had been visited however, performed significantly better on tests given.

Working with children 14-36 months old, Schaefer (1968) sent highly trained tutors into the children's homes for intensive work with the mothers. Over a period of twenty-one months the tutor met the mother one hour daily, five days a week, to guide her in skills related to the intellectual stimulation of her child. Findings indicated a significant relationship between variations in child care and children's IQ test scores.

Gordon (1968) progressed along somewhat different lines in his work with very young children (ages 3-24 months). Rather than sending highly trained professionals to work with mothers, he prepared special activities and trained unskilled indigenous aides to teach the activities to mothers. His objective was both to raise the intellectual level of the children and to increase the competence of the mothers. Following two years of such home instruction, the experimental treatment group performed significantly better than the no-treatment controls on 2 out of 3 measures of mental development. At the same time, experimental mothers showed a significant increase in feeling of internal control on Rotter's test of internal-external control.

Vance (1967) suggests that the home and neighborhood environment can be as useful in developing necessary language and social skills as well-planned pre-school programs. There are, indeed, an increasing number of intervention programs involving parents at home and in parent-education settings as well as in the classroom (Caldwell, 1966; Gordon, 1968; Gray and Claus, 1966; Weikart and Lambie, 1968; Swift, 1969; Deutsch, 1965).

There are also attempts to involve American parents in their children's educational development on a national scale. Headstart requires parent participation in the preschool's routine class activities as well as in planning, maintenance and special programs. Homestart aims to facilitate the child's preschool development by enabling parents to become more effective teachers of their children. This is done in close collaboration with a wide spectrum of community services on a basis of community cooperation. There are as yet no overall statistics on Homestart, but some findings on local programs are available.

In Waterloo, Iowa, (Thompson, 1972) Homestart I consisted of 2 groups: four-year-olds who received one year of prekindergarten home enrichment, and two-year-olds who participated for three years, receiving home visits with the addition of classroom experience for the last few months.

Findings to date show a direct relationship between the type of program and the extent of intellectual growth, as measured by the Primary Mental Abilities Test. Children in the three year program show significantly larger gains than children in the one year program. The one year program children achieved gains modestly higher than their older non-Homestart siblings while those in the three year program achieved significantly higher scores than their older siblings. Success in improving parents' effectiveness was illustrated by increased enrollment of children in preschool, enthusiastic participation in trips, and by the fact that toys were generally returned in good condition. In summary, it appeared that the longer the family participated in the program, the greater the effect on the child's school achievement. The precise nature of the changes effected within the family were measured using a variety of techniques with equally various reliability.

Programmed Instruction

The teaching medium used in our study for guiding the mothers is programmed instruction. Everything the mother has to do is specifically stated in each lesson, requiring no decisions on her part. The carefully structured program, which progresses in simple planned stages, promises mastery of the material by the child and points of difficulty can easily be identified for further work. The program is so very simply designed that a mother has no difficulty in administering it.

Weikart and Wiegerink (1968) carried out a program combining classroom and home tutoring for 3-4 year-old children, comparing three experimental classroom conditions: traditional, Piaget-based, and a Bereiter-Engelmann language training program. Significant gains were reported for all groups, but differences between the groups indicated that the traditional approach was least successful.

In comparing five early-childhood programs for the disadvantaged which varied in degree of structure, Karnes (1969) also found that programs increased in effectiveness with increased structure.

Programmed instruction has been suggested as singularly appropriate for dealing with individual differences in young children's rates of learning (Gotkin, 1963) and in adapting to the needs and abilities of individual children (Gage, 1968). Individualized programmed instruction has been used successfully with young children in a variety of situations: Keislar and McNeil (1961) found it an effective means of teaching first grade children abstract scientific language. Hively (1962) trained both preschool and first-grade children in a series of progressively difficult discrimination tasks. For both age groups Hively found such programmed training much more efficient than training in the final discrimination task alone. In both studies the children appeared to be interested, involved, and responsive. Young children's short attention span apparently is not a handicap to learning when programmed instruction is used. Three- and four-year-old children who successfully acquired primary reading skills following instruction with a computerized typewriter presented no problems in attention and involvement in the learning situation (Steg et al., 1969).

Programmed tutoring was used by Ellson (1969) to supplement regular classroom teaching. His findings indicated that neither classroom instruction nor programmed instruction alone is as effective as the two techniques combined. All the children in our study attended regular preschool classes, so the home instruction period could be considered supplementary tutoring such as that used by Ellson, but the tutors in our study were the mothers themselves.

While the programmed instruction was expected to be of direct benefit to the children, an equally important expectation focused on the mother as a tutor. The ease of administration of the program contributed to a feeling of mastery. In addition, as she observed her child mastering the skills taught, the mother's sense of confidence in herself and in the educational program increased. She saw herself controlling the educational setting while her child learned successfully. This was a unique experience for many of the mothers, who were frequently pervaded with a sense of helplessness and doom in relation to the "outer power" by whom they felt manipulated.

Sub-Professional Aides

Services to poverty areas are typically provided by persons residing outside the area. Teachers, nurses, social workers and other professionals work with the poor by day but return to their own neighborhoods at night. Such services by "outsiders" can do little to build community strengths and the kind of independence necessary to help overcome the effects of poverty. Recent poverty programs have recognized this. Headstart's successful emphasis on the inclusion of indigenous aides to assist teachers, social workers and nutritionists is an example of the efficacy of focusing on the deficiencies in the child's community as well as in the child himself.

The use of subprofessional aides in education deals with two basic problems. Firstly, as we recognize the growing urgency of the problems of poverty, the economic issues of manpower and budget become more and more pressing. Indigenous aides can be drawn from hitherto relatively untapped sources of manpower, the unskilled housewives. By working with such aides, a single highly-paid professional can spread her professional training over a wider field of action. Such a distribution of skilled and unskilled manpower both lowers costs and increases the possibilities for scope of activity.

A second problem relates to the establishment of meaningful communication between middle class teachers and lower class children. In education, as well as in the social services, accuracy and effectiveness of communication could be the crucial determinants of success or failure (Jones & Gerard, 1967). Educational research (Lopate et al., 1970) has shown that school achievement is greater where distances between the home and the school can be lessened and the child and his family can be made to feel a greater control over their destiny.

There is a limit to the extent to which the middle class teacher can bridge this gap, but the subprofessional, because of her life-experience and nonexpert function can go further to effectively closing it. (Riessman, 1966). Mothers and other local adults have generally been the ones to be recruited for this purpose. A few recent programs, however, have used high school students to tutor younger students. Melaragno & Newmark (1968-9) and Ashby & Lynch (1969), who have successfully experimented with such programs, found that both the tutored and the tutor students benefited in their studies.

Zehrbach et al (undated mimeo) report on a number of studies (Karnes, Zehrbach & Teska, 1971; Karnes, Teska, Hodgins & Badger, 1970) which, on comparing projects aiming to develop cognitive skills of preschool children on the basis of who administers them, found that children do gain significantly when taught by individuals other than a trained teacher. Quality and intensity of supervision and training of the nonprofessional - which could be an indigenous adult, a mother or an older sibling - was seen in all cases to have strong influence on his effectiveness. This finding led to the development of a model of the Paraprofessional Educator Manager, PEM, which is seen as a qualified professional who also has personal qualities enabling him to supervise a small team of nonprofessionals working directly with children.

Subprofessional aides have been generally restricted to the formal setting in studies and training schemes carried out so far (Wickens, 1969-70; Tanner & Tanner, 1968; Riessman, 1966; Bowman & Klopf, 1968). Many of the problems which have arisen concerning the use of subprofessionals center around role definition. A teacher may feel threatened by the presence of an aide, while the aide frequently feels the tasks given her to be despised by the teacher and therefore worthless (Lunneborg, 1969).

It is suggested here that by working in the home setting, aides can make full use of their strengths without facing those problems and conflicts encountered in the schools. Working as instructors to mothers, the aides have a further advantage over highly-skilled professionals. They belong to the mother's social group, they are similar to her in many ways, and they have achieved a measure of success which is not out of her reach. These factors combine to make of the aide a potent model (Bronfenbrenner, 1969) after which the mother can pattern herbehavior as teacher. A successful example of such a program is that of Micotti (1970), who successfully trained eleven local women to teach 40 3-5 year-old low-income children in their homes. At the same time, the children's mothers were trained to improve their teaching techniques. After one year the children showed marked improvement in concept and language development and mothers showed considerable attitude and behavior change in terms of educational materials in the home and upkeep of themselves and the home. Increasedparent interest in their role as teacher was achieved by Jester (1969) who sent subprofessional parent educators to visit parents in their homes and give them specific tasks to do with their children.

Aides are members of the community, they are mothers, and they are involved in the problems of poverty. Close contact with professional educators and an educational program provides the aides with opportunity for learning new techniques for educating their own children. Successful work as an aide can bring about a rise of esteem, aspirations and expectations (Barbrack & Horton, 1970) and might also lead to a striving for the kind of upward mobility which requires further education and training and which will serve to help the aide in handling the problems of poverty more effectively. Finally, a well-functioning aide serves as a model of attainable success for the women of the local community.

Effects on Family and Community

A community program aims at affecting the community as a whole. This is an important concomitant to the long range success of the total program. The introduction of new ideas, attitudes and educational techniques should affect not only the families with whom we are working, but the larger community of which they are a part.

Such a diffusion effect was found in the Early Training Project (Gray & Klaus, 1966) where home visits were incorporated in an intervention program for disadvantaged children. Miller (1968) studied diffusion effects on younger siblings in families participating in intervention programs and found that those children who had older siblings and parents participating did better on all comparisons than those children where only the older sibling participated. Gilmer (1969) obtained similar results from her study of 80 preschoolers' knowledge of concepts. In addition, she found that there was increased differentiation of performance from matching to recognition and identification in favor of groups whose mothers were involved in the program.

POPULATION

The study included 161 children drawn in two phases (1969, 1970) and assigned to one of several experimental groupings.

In 1969, the Tel Aviv Municipal Department of Education helped us to locate seven preschool classes with predominantly disadvantaged pupils in which one-half or more of the children would be between three-and-a-half and four-and-a-half years old in December 1969. Six of the seven classes selected were located in the Hatikva Quarter in Tel Aviv. The seventh class was a few blocks away, in the area of the Tel Aviv Central Bus Terminal.

Demographic information on this initial population was gathered with the aid of a simple questionnaire. The interviews were conducted by the aides and the field coordinator during the early months of the study. At the time, the children's ages ranged from 47 to 58 months, with a mean age of 53.8 months. There were many more girls in the classes we selected, yielding a total of 71 girls and 49 boys.

Parents' ages ranged from 18 to 57 years, but most were 26-41 years old. Table 1 indicates percentages of parents in each of three age groups:

Table 1

Age of Parents

Mothers N=111		Fathers N=105	
Ages	Percentage of Total	Ages	Percentage of Total
18-25	21%	26-33	39.1%
26-33	47.5%	34-41	37.1%
34-49	31.5%	42 & over	23.8%

Patterns of parent education were generally similar for mothers and fathers, with a somewhat greater number of mothers in the uneducated group, and a higher representation of fathers in the highly educated groups. Eighteen percent (18%) of all parents had no formal education at all. Eighty-eight percent of the mothers and 76% of the fathers had no more than eight grades of elementary schooling. Five fathers completed high school and, of these two fathers continued for another two years of college.

The Hatikva Quarter was originally settled by Yemenites and is still thought to include a large number of Yemenite families. In our sample, however, only 15.3% of the fathers and 5.4% of the mothers were born in Yemen. The largest percentage of parents (45%) was born in Iraq and Iran. The largest group of mothers, however, was Israeli born (24.3% of all the mothers), while only 13.5 of the fathers were Israeli by birth. The remaining parents (26% of the fathers and 24% of the mothers) originated from 15 different countries in Europe, Asia and Africa (Table 2). Hebrew was spoken in all the homes studied. It was the only language spoken in 31% of the homes, and was used along with Arabic in another 29% of the homes.

The number of children per family ranged from two to ten. None of the homes in our population was larger than three rooms, and 75% of the families lived in homes which had two rooms or less. The number of persons per room increased as the size of the home decreased. Table 3 describes this relationship.

Since our study is concerned with home instruction, it is of particular interest to note that 61% of the four-year-old children in the sample had younger siblings. Of these, approximately 15% were the oldest in their families; since there was an average of 4.0 children per family it seemed correct to assume that these "oldest" children would have still more younger siblings in time.

In the fall of 1970, 41 new children were added to the sample. These children were drawn from the kindergartens into which the first year children moved, and were all at least five years old.

Demographic data were collected on these new families. A comparison was the made between the 1969 and the 1970 samples with reference to (1) the number of children in the family, (2) mother's level of education, (3) room density, and (4) country of origin of parents. No significant differences were found. Information on country of origin for the combined population is presented in Table 2.

Table 2

Country of Origin of Parents (Year 1 and Year 2)

Country	Fathers %	Mothers %	Total
Israel	15.2	20.9	18.1
Iraq	20.3	22.8	21.6
Persia	24.7	27.8	26.2
Yemen	10.8	4.4	7.6
Syria	7.6	5.7	6.6
Other - Europe	7.6	5.7	6.6
- Asia	13.8	12.7	13.3
Total	100%	100%	100%

IMPLEMENTATION

FIRST YEAR: 1969-1970

Assignment to Treatments

Teachers in two of the sample classes volunteered to use the experimental instructional materials with their children. The number of children in these classes, which were subsequently designated as Teacher Instructed, totalled 42. In the remaining four classes, all located in the Hatikvah Quarter, children were randomly selected, by class, for the Home Instruction program (N=48) or the Control group (N=30). Two of the Control children in one class moved, leaving only 18 children in this group. Since the distribution of children into treatments was unbalanced, an additional 12 children from another class (class 7) were added to the Control group during the post-test period, bringing the total population up to 120 children. Table 3 shows the distribution of children in treatment groups by classes.

Table 3

Experimental Treatments by Class

	Teacher Instruction	Home Instruction	Control	Total
Class 1	n = 26			26
Class 2		18	9	27
Class 3		10	3	13
Class 4		9	1*	10
Class 5	16			16
Class 6		11	4	15
Class 7			12	
Total	42	48	30	120

*Two of the three children assigned to the group moved.

Table 4 shows the distribution of children in treatments by age and by sex. All the ages clustered around 54 months. There were approximately 50% more girls enrolled in the sample classes than boys. This proportion was not consistent across the classes, with the two teacher-instruction classes consisting of twice as many girls as boys. Since all the children in these classes were involved in the experimental instruction, the disproportionate distribution was unavoidable.

Table 4

Distribution of Children into Treatments by Sex and Age

	Mean C.A. in Months	No. Boys	No. Girls	Total
Teacher Instruction	54.1	13	29	42
Home Instruction	53.6	21	27	48
Control	54.6	15	15	30
Total	54.2	49	71	120

Home Instruction

Following assignment to treatments, contact was made with the homes of the children who had been assigned to the Home Instruction program. In the middle of October, shortly after school resumed following the Succoth holiday, a letter was sent home with each child. While the letter indicated that the family would be part of a new educational program, we had no assurance that it would be read or understood.

Introductory home visits by the aides and the field coordinator followed the letter by approximately one week. The object of the visit was threefold: (1) to become acquainted with the family; (2) to get the mother's agreement to participate in the project; and (3) to determine which of two home-instruction conditions was appropriate for the family setting. Those mothers whose reading ability was adequate and whose mornings were free were scheduled to meet with the aide one hour weekly in the absence of the child. During this hour the aide would present the week's work to the mother and prepare her for the five daily sessions with her child.

It was anticipated that there would be mothers whose level of reading would be inadequate for even the simply-written materials we prepared. These mothers were scheduled to meet with the aide, who in the presence of the mother, would teach the child the important points in the week's lessons and show the mother what she was expected to do in reviewing and completing the exercises. In practice, an older child was frequently drawn into this teaching session and subsequently made responsible for the daily instruction, under the supervision of the mother.

The Home Instruction treatment group was thus taught under different conditions, depending upon the literacy level and availability of the mother. In one variation, the aide worked directly with the mother in the absence of the child. The second variation called for the aide working once weekly with the child in the mother's presence, while the mother, whether alone or together with an older sibling, followed through with daily exercises.

In the present study practical considerations prevented the isolation of the differences in effects of home-instruction conditions. This factor was incorporated into a later study and will be reported at a later date.

Teacher Instruction

It had been suggested that the development of a good set of instructional materials might in itself be enough of an educational intervention to boost the intellectual performance of the child. If so, the aides and the home instructional situation would add little to the level of the child's achievement. Accordingly, two teachers used the experimental instructional materials in their classrooms as part of the regular curriculum. The classes were composed of 18-30 children and it was decided that,since only about one hour daily was available for small group work, instruction would include about six to ten children at a time. This was more than originally anticipated, but no other grouping was possible.

The field coordinator was in regular contact with the teachers. She met with them weekly to present and clarify the objectives of the lessons for the week. Rather than review each lesson in detail, the field coordinator focused on the instructional objectives, and indicated what materials had been prepared for each objective. The teachers were free to use the materials as they wished, to add to them and to alter them in whatever way they deemed appropriate.

Control

Children assigned to the Control treatment attended the regular sessions of their preschool classes. Their teachers were not involved in the study, however, and the aides did not visit their homes.

Staff

Three aides were recruited for the first year. Since the project was somewhat late in getting underway, we were able to locate only one aide from the actual target population. She was Yemenite by birth, educated eight years in Israel (through elementary school), and the mother of two preschool children, one of whom attended a kindergarten in the neighborhood. Another aide lived in an adjacent neighborhood, similar to that from which the experimental population was drawn. She was Persian born, had been in Israel approximately seven years, and had also had eight years of elementary school. Her two preschool children were enrolled in full-day nursery school and kindergarten programs, freeing her for work. Widowed in the Six-Day-War, she lived with her husband's aged grandmother in a two-room flat. The third aide was also a war widow, but was older. Her husband fell in the Sinai campaign (1956), leaving her with three young children. In spite of her own limited education (eight years of elementary school), all of her children attended high school and one continued on to university. Of the three aides, she was best prepared for her role, having served as an aide to a kindergarten teacher for several years.

Following recruitment, the aides underwent a week of training during which the objectives of the study were discussed at length and the aide's role as teacher in the homes was analyzed in as many ways as possible. After they had familiarized themselves with the instructional materials, they practised using them with one another in a series of role-playing situations. This training period was conducted by the project director, assisted by the field coordinator.

The role of the field coordinator was to supervise and coordinate the work of the aides in the actual field situation. The field coordinator selected was a master kindergarten teacher whose professional experience included lecturing, demonstration and supervision in the field of preschool education.

In addition to the aides and the field coordinator, the research staff for the first year included three research assistants who were primarily concerned with designing and writing instructional materials. Two additional research workers assisted in data collection and analysis, maintaining records, and probing research issues related to the study. The instructional materials were illustrated by a staff artist and prepared for publication by the staff secretary.

Aides as Instructors

The use of nonprofessional aides, whose preparation for their roles was minimal, might have been problematic. Specifically, the ability of the aides to interpret materials, to deal with mothers, and to persist in their task, was in question.

During the first year, there was no difficulty in preparing the aides as teachers. The were able not only to understand the instructional materials, but questions raised by them at the weekly training conferences indicated an awareness and an appreciation of the problems involved in teaching. They spotted errors in the texts and were creative in suggesting new ways of handling specific teaching problems.

The relationship between aides and mothers developed slowly and along the same lines for all three aides. Each of the aides clearly indicated, at one time or another, the pleasure with which she brought new learning materials into the homes. These feelings of involvement and confidence in the program were evidently transmitted to the mothers. While they assumed a role of "friendly visitor" in the homes, the aides were quick to use the threat of withdrawal of their services when they felt the family was doing less than its fair share in the home instruction program. In several instances, the aides had to go beyond their role of transmitter of materials. Some of the younger mothers, especially, had trouble in organizing their daily schedule so as to be free for instruction periods with their children. In such cases, the aides sought ways of guiding mothers in the organization of their time, often with results far beyond their expectations. One mother was finally helped to find a solid block of time in which to do the family laundry -- while waiting for the aide to come. This guaranteed her presence at home and at the same time provided the family with cleaner clothes than ever before.

The aides worked five days a week, four days in the field and one day in conference. The only break in their schedules was due to illness, and in such cases it was possible for the field coordinator to fill in for them. Each day's teaching schedule was prearranged by appointment with the mother. When, as was often the case, the mother had a change in routine and was not on hand for the arrival of the aide, this did not mean the lesson was missed. Where possible, the aide returned at a later hour and, if the mother was still not available, a neighbor or other family member was contacted so as to arrange an alternative time. Some mothers assumed responsibility for contacting the aides, as in the case of a young woman whose husband was in the army for a month's reserve duty. The woman moved to her mother's home in a nearby town and registered her child at a local nursery school for the month, but arranged to return once a week to meet with the aide at home so as to receive her weekly package of instructional materials.

The 48 Home Instruction families were divided evenly among the aides so that each had 16 mothers to work with. Since the aides were employed on a half-time basis, this allowed work with four families daily for four days. The fifth day was spent reporting on the week's work and preparing for the following week's teaching program. The aides wrote weekly reports on their home visits and these reports formed the bases for discussion of problems confronted during the week. The reporting sessions were conducted by the project director and regularly included one or more members of the research staff. This provided open channels of communication between the writers and the field workers.

The weekly reporting session also provided an opportunity to review the progress made by the teachers using the programmed materials in the classroom. The field coordinator, who was in regular contact with these teachers, reported weekly on the problems and progress in the Teacher Instructed group.

SECOND YEAR: 1970-1971

Assignment to Treatments

The design for the three-year experiment in the Hatikva Quarter included the examination of the cumulative effects of instruction as well as a comparison of instruction under two experimental conditions. The two conditions, home instruction and teacher instruction, had been compared at the end of the first year, and the latter was found to be both less efficient and less effective. Nonetheless, it was decided to examine the cumulative effect of this experimental treatment as planned. Since all the children in these classes changed teachers at the end of the year, spreading out into a number of different kindergarten classes, we enlisted the help of the Ministry of Education in concentrating the enrollment of as many of these children as possible into at least one kindergarten class with which we could continue teacher instruction.

At the beginning of the school year, 17 continuing teacher instructed children were concentrated in one class. These, with the additional 19 children enrolled in the same kindergarten class, made a total of 36 children in the second year teacher instructed treatment condition. However, only 26 children in this group were available for testing at the end of the year. All of the 19 'new' children had had one year of prekindergarten education in other classes. The kindergarten teacher was new to the program, but agreed to use our instructional materials in her work with the children. Our field supervisor worked closely with this teacher to help in the adaptation of the materials to the classroom setting.

Twenty-two new 5-year-old children were added to the home-instruction treatment group, thus enabling us to compare the effects of different ages of entry into the program. Thirty six children continued into their second year of home instruction yielding a total of 38 children in this treatment group. Of these, one child was not available for post-testing. There was thus a total of 83 children in instructional treatments, 26 continuing controls, and an additional 29 children who had had one year of instruction and were now in a 'follow-up' control group see Table 3).

Staff Changes and Development

After one year of experience, the aides were ready to take on an increased caseload. Each aide worked with 19-20 families, continuing with her 'second year' children in addition to 7-8 new children.

The aides were, by now, able to serve the additional function of helping to identify those factors which appeared to relate to successful involvement in the Home Instruction program. The method used to gather this information was the cue-sort, an extremely simple instrument which was handled easily and unselfconsciously by the aides. A specific question was posed, with three or four alternative replies, e.g. "Does the mother

TABLE 5

Instructional Treatments by Years

	1969		1970		1971		1972	
	Sample	Tested	Sample	Tested	Sample	Tested	Sample	Tested
Home Instruction:								
1st wave	48	48	36	35	26	21	no instruction follow up only	
2nd wave			22	22	11	10		
Teacher Instruction:								
1st wave	42	42	17	15	no instruction follow up only		no instruction follow up only	
2nd wave			19	11				
CONTROLS (uninstructed)	30	30	30	26	30	16	30	12
FOLLOW UP:								
after 1 yr. HI			12	6	23	12	23	9
after 2 yrs. HI					10	7	21	13
after 3 yrs. HI							26	18
after 1 yr. TI			25	23	28*	18	28	18
after 2 yrs. TI					17	12	17	11
SUB-TOTAL	120		161		145		145	
Lost permanently or dropped for technical reasons			12		43		49	
TOTAL	120	120	149	138	102	96	96	81

* Does not include 16 children in Class 5 who were dropped as demographically unrepresentative (see p.56)

enjoy teaching her child?" (Possible replies: yes / indifferent / no / mother does not teach). The aide was given the four envelopes, each marked with one of the possible replies, and a pile of cards, each labelled with the name of a family. All she had to do was to put each card into the appropriate envelope, thus indicating which family belonged to which category of response. The use of this technique enabled the aide to give us information on: the families' general situation and attitudes; their relationship to the program; their relationship to the aide; and also the aide's own perceptions and attitudes relevant to her functioning in this role.

The Instructional Program

The instructional program for the second year included progressively more complex content and several new content areas. In addition, since post-testing at the end of the first year gave an indication that many children had reached a 'ceiling effect', an attempt was made to allow the children to progress at varying rates. This was handled by raising the level of difficulty of the materials and increasing when indicated the number of weekly 'lesson units' provided. Decisions as to pacing for the individual children were arrived at during the weekly field staff conference.

THIRD YEAR: 1971-1972

Assignment to Treatments

In the third year all the children were enrolled in first grade. Budget considerations required the curtailing of the programs and cutting back to the essential elements in the design. The teacher-instruction condition was stopped since the first grade curriculum had to take precedence over the home-instructional materials. All home-instruction children who lived in outlying areas or those with whom it was technically difficult to continue were dropped, leaving 37 children in the third year. Of these, 31 were available for testing at the end of the year. The original control group was followed up together with drop-outs and partially instructed groups wherever possible. However, contact became increasingly difficult, as in the third year these children were spread over more than 22 classes.

Staff Changes and Development

Several major changes in staffing occurred during the third year: (1) The field coordinator was unable to continue, leaving the aides without local supervision; (2) One aide was transferred to a neighboring area where the project was about to be replicated; (3) The two remaining aides continued to function without the coordinator for this final year. They divided the 36 families between them and in addition they widened their field of activity by undertaking a number of specific administrative tasks previously carried out by the coordinator.

The Instructional Program

By the third year, we felt that the mothers would be able to decide independently how much of a given activity was suitable for her child at any given session. Accordingly, the instructional materials for the third year were not organized by 'Day's Activity' but by the subject area. The program was thus somewhat less structured, allowing for a greater amount of initiative on the part of the mother.

Since the children were learning to read in school during this period, an attempt was made, whenever possible, to provide simply written instructions in large letters, so that the children themselves would be able to 'read' what to do.

Content for this year focused increasingly on memory skills and problem solving with a good deal of attention given to story-construction.

FOURTH YEAR: 1972-1973

No instruction was given during this period, nor was contact maintained with the families in the sample.

At the end of the school year (June, 1973) all the children were tested in their schools.

THE PROGRAM OF INSTRUCTION

Content

The instructional program focused on three major areas of intellectual functioning: formal language, sensory discrimination, and problem solving. Formal language instruction centered around simple, commercially prepared story books. In the course of reading, reviewing and discussing the books used, the story content was probed for details, vocabulary and new concepts. Story sequence and the new concepts learned were incorporated into games and exercises designed to provide further experience and review of the new material.

Sensory discrimination skills in the instructional program included visual, auditory, and tactile discrimination, with special emphasis on appropriate labels for identifying and discriminating between stimuli. Extensive and varied exercises requiring "same-different" discriminations were included throughout the years and the children were taught to seek and identify critical attributes of materials presented. While most of these tasks were visual, auditory and tactile stimulus materials were included wherever possible. The possibilities were limited, however, since a home-centered program precludes the use of equipment which is not readily available in the home. The discrimination program did include a variety of visual-motor exercises which focused on visual-motor control under varying conditions, and skill in using pencil and paper purposively.

The program of instruction in problem-solving was built along the lines of Guilford's model, as described in Merrifield, et al (1960). The first two of six hypothesized factors involved in problem-solving formed the bases of our curriculum in these areas: (1) "The ability to think rapidly of several attributes or characteristics of a given object" (p.6). This includes the ability to list the attributes of objects or ideas as well as to identify similarities and differences between the objects or ideas; (2) "The ability to classify objects or ideas" (p.6), which requires skill in pairing or grouping given objects or ideas. Exercises in problem-solving skills thus included work on discrimination skills and appropriate labelling, as well as sorting, identification, matching and grouping.

A major portion of this aspect of the curriculum was taught through the use of matrices similar to those suggested by L.G. Gotkin (1968). Through the program of matrices the children were taught to: (1) identify and match pictures; (2) follow directions of increasing difficulty in selecting and marking pictures; (3) accurately describe a series of related pictures; (4) formulate questions and give directions in reference to the matrix pictures; (5) group pictures along varying dimensions (i.e., number, activity, form); (6) describe a logical relationship between pictures in a matrix; (7) construct a 4 x 4 matrix using 16 related pictures.

Within the framework of the three major foci of instruction - formal language, sensory discrimination, and problem-solving - the program required the children to use a variety of modes of response. In a given lesson a child may have been asked to "do something" (motor activity), "repeat what

I say'" (echo) and and answer questions (respond). An opportunity was generally provided for the child to formulate and ask questions (test) and ultimately he was asked to do the instructing (structure) while the mother acted the part of the pupil. While not all the responses were required of the child in a given lesson, they were interspersed within a given unit of instruction to strengthen the child's skills while at the same time providing variety.

Emphasis on the three major areas of intellectual functioning was distributed differentially over the three years of instruction according to the children's age - four, five or six years (see figure 1).

During the first year, the focus was on books and discrimination skills with just one major program in problem-solving. Whereas the books were fundamental components of the program, discrimination skills were considered of major significance in handling the many concept-based tasks which we considered to be prerequisities for problem-solving activities (Merrifield, op.cit.).

The second year's program provided reinforcement for the first year's work. As we were able to assume a certain basic knowledge in labelling, visual-motor and discrimination skills, it was possible to decrease the emphasis on the discrimination program and slightly increase the problem-solving activities, including work in basic math skills and concepts. We maintained the amount of visual-motor exercises constant, as we felt this to be an important introductory element to later writing.

By the third year, the emphasis shifted from discrimination to problem-solving wherever possible. Thus, even in book-based lessons a problem-solving element was introduced; children were asked to construct stories from basic information given and an increasing reliance on memory was demanded.

Organization

A unit of instruction covered a given subject and was divided into five to ten-minute lessons. The number of such lessons varied. Most formal language "book" units involved eight to ten lessons, while some of the discrimination units had as many as 25 lessons. In general, a day's work involved two lessons from two different units and took 15-20 minutes.

In the first year the weekly program was scheduled for five days of home instruction, or ten lessons. The subjects overlapped so that usually no more than five units appeared in any week. The following sample program for one week of the first year indicates the plan of organization:

Day 1 - "Shapes and Colors" - Objective: to identify and distinguish between the shapes and triangle, square and circle, e.g. "This is a circle". "Small-large" - Objective: to distinguish between small and large fingers and toes; to compare his own small hand with mother's large ones.

Day 2 - "Book" - "Yossi has a Bicycle" - Objective: familiarity with the contents of the book. Story read in full.

"Shapes and Colors" - Objective: exercises with triangles, squares and circles, e.g. "Now I'll hold up a shape and you'll tell me what it is called".

Day 3 - "Same-different" - Objective: to recognise pictures that are the same; to teach the concept of "the same",e.g. "Are these two pictures the same?"

"Small-large" - Objective: to differentiate between small and large stones found in the yard, e.g. "Put the large stones here - put the small ones there."

Day 4 - "Loud-soft" - Objective: to teach the distinction between a loud, soft and pleasant voice, e.g. "Speak very quietly --- What voice did you use?"

"Same-different" - Objective: to identify same and different in pictures differing only in size; to justify his answer, e.g. "Are these two pictures the same? Why?"

Day 5 - "Loud-soft" - Objective: to teach the distinction between loud and soft voices; imitation of loud and soft voices; listening to loud and soft voices on the radio, e.g. (Mother turns on radio). "Who is speaking in a louder voice, you or the radio?"

"Book" - "Yossi has a bicycle". Objective: use of book to arouse thought; familiarity with parts of bicycle, e.g. "Put your fingers on the handlebars in the picture".

In the second year, several new kinds of lessons were introduced. The following represents lessons from programs introduced in the second year of instruction:

Rhyming game - Objective: to develop auditory discrimination by means of rhymes.

In this game the mother has a pile of cards with two pictures on each card. Each pair of pictures is either identical (cat - cat) or rhyming (hat - cat). The mother looks at the top card without showing it to the child and, reading the labels, asks the child if the words are the same or different. If the child replies correctly he is given the card, if he gives a wrong reply he is shown the card and asked the question again. The card is put at the bottom of the pile and the game continues till the child holds all the cards.

This game utilizes skills learned by the child during the first year in the 'organizing dots' lessons.

How many is three? - Objective: to work on the concept of 3 in several contexts.

For example: (1) Mother puts three matchsticks on the table and asks the child to count them. She then transfers them, one by one, to a container (any suitable kitchen container) and the child counts them as she puts them in and again when they are all together; (2) The child identifies pictures with three objects from a collection of pictures with different numbers of objects; (3) The child selects three objects from a picture of many objects.

Numbers are introduced in the second year as a new concept on the assumption that the child's ability to observe and identify will serve as a basis for the learning of numbers.

In the third year programs were categorized according to lesson units rather than days and the children advanced at different rates according to age and ability. Ongoing evaluation ensured that each child progressed at the rate best suited to him. The following are sample lessons from programs introduced in the third year.

What's Missing? - Objective: to develop in the child the ability to distinguish missing parts of a whole. In one such lesson the child is shown a series of pictures. In each series a model picture is complete and the pictures next to it are incomplete. For example, the model is a whole fish while next to it are a fish missing an eye, a fish missing a fin and a fish missing a tail. The child is asked to complete the incomplete pictures using the model as a standard.

This program utilizes skills learned in earlier programs in which the child was taught to identify similar and different pictures.

Sorting - Objective: to learn to categorize items and to identify the shared element. In the more advanced levels of this series the child is shown two rows of pictures. In the upper row, all the pictures have a shared property (e.g. all are work tools). Only one of the pictures in the lower row shares this property. The child is asked to name the shared property of the objects in the upper row, to find the picture of one object in the lower row that shares this property, to cut this picture out and paste it in the upper row.

This program utilizes the child's earlier training in identifying same-different objects and problem-solving skills.

Each lesson was written in full detail, including the actual words to be used in instruction. The format used indicated the instructor's actions and words, the expected response from the child, and the instructor's corrective feedback (see Appendix A). Since the program was designed for non-professionals, emphasis was placed on consistent corrective feedback under all circumstances. Whereas a skilled professional might be able to pick up a child's incorrect response and use it as a springboard for teaching, we could not expect this from either the non-professional aides or the mothers.

A detailed description of each lesson was used by the aides in preparing for their teaching roles. The mothers received a special guide sheet for each lesson. This sheet incorporated the essentials of the lesson using both pictures and text and provided information for feedback after the child's response in order to encourage maximum verbalization on the mother's part. For a mother whose reading skills were limited, the pictures served as cues to activity while the limited text allowed focusing on essential terminology and verbal instruction. The mothers' guide sheets were color-cued for a day's work so that the mother used sheets of a single color on any given day.

In addition to the aides' guidesheets and the mother's instruction sheets, a weekly program packet included work sheets and materials for the children's use. The number and nature of these work sheets varied according to the subjects being taught.

EVALUATION

Evaluation of the program was carried out periodically over the four years. Statistical analyses focused on two areas: (1) the extent to which the children were learning the materials taught, and (2) the degree of transfer of learning attained. In addition, the feasibility and impact of the program as a community-based operation was of constant interest.

Statistical Findings

The problem of finding measures for evaluation of learning and transfer in young children are well known. For us there was the additional issue of language, since very few of the available and standardized tests for 4 year-olds can be used in Hebrew. As a result the choice of measures at any one period was determined more by the availability of tests than by the possibility for test-retest over time. Thus, since it was not feasible to do individual testing at the outset, two measures of general intelligence,Goodenough Draw-a-Man Test and Columbia Mental Maturities Test,were selected for comparison of treatment groups at age four only. The following years, since the children were 5 years old it was possible to administer the Israeli version of the Wechsler Preschool and Primary Scale of Intelligence. Similarly, the selection of tests at the end of the second year was guided by an interest in the best possible measures of achievement at that time, again with less consideration of comparison of measures over time.

In only one area was it possible to use the same test over the years. Our program involved a good deal of visual discrimination training, with specific focus on the kinds of skills involved in the Spatial Relations sector of the Marianne Frostig Test of Visual Discrimination. This sector of the test was therefore administered to all children at the beginning of the program and at the end of each of the three years of instruction.

Tests of learning in specific instructional areas varied each year according to the content of the instructional program. There was also a sizeable amount of information on learning in the subjects of the standardized tests administered.

Additional statistical information on the effectiveness of the program was gathered over one three-year period by the use of special measures, some of which were constructed to meet our specific needs.

Evaluation of Learning in the First Year (1969-1970)

(a) Pretests: Six measures used as pretests were administered prior to assignment to experimental treatments. The Columbia Test of Mental Maturity and the Goodenough Draw-a-Man Test were selected as being essentially independent of verbal skills. They were administered in order to establish baseline data on the intelligence of the children.

Sections I and V of the Marianne Frostig Developmental Test of Visual Perception were administered as measures of those visual perception skills (eye-hand coordination and spatial relations) which we felt were particularly related to areas of ability on which we would focus. Previous studies done by the author gave evidence that administering all five subtests of the Marianne Frostig test to four-year-old disadvantaged children is impractical. The test is too long and the tasks are too difficult for any substantial reliability of results with these children.

A "Shapes and Colors" test was developed to measure the child's ability to define size (large, small), shape (triangle, square, circle) and color (red, yellow, blue). The child was asked to make identifications at three decreasing levels of difficulty. A child who successfully completed a task at one level was not required to continue on to the simpler tasks in that section. The three levels of difficulty were verbal labeling, selection in response to a given label, and matching.

A "Same-Different" test was designed to measure a child's ability to use the concepts of same and different, to discriminate between pairs of geometric shapes or pictures of objects. Dimensions of difference used were content, number, size and directionality. The test was composed of 32 paired items. The first 16 were drawings of commonly-known objects, such as articles of clothing and household items. The remainder dealt with abstract shapes. The child, upon seeing each pair of items, was required to indicate whether they were the same or different.

Since the six pretests were administered to examine the degree of homogeneity of the sample population, the data were analyzed both by class and by treatment. Table 6 presents the test scores for all children, by class. There were no significant differences on measures of visual-motor functioning or ability to use the concepts "Same-Different" in a visual discrimination task.

An analysis of variance indicated that children in two classes were significantly better than the others in their performance on the Shapes-and-Colors test. These children were able to answer 74-75% of the questions correctly, as against children in the poorest classes who achieved a mean score which represented only 53% of the possible total score. Shapes and colors are included in the preschool curriculum for all schools. Since pretesting was done in the month of October, it is probable that two classes had training for the Shapes and Colors test during the first six weeks of the school year.

On measures of intelligence the total group proved generally homogeneous. There were no significant differences on the Columbia Mental Maturity test, while on the Goodenough Draw-a-Man Test one of the seven classes' performance excelled at the .05 level of significance. A Newman-Keuls analysis of the difference (Winer, 1962) showed that children in this class scored significantly higher than only one other of the seven classes.

Means and standard deviations for all children, by treatments, are presented in Table 7. Although the children had been randomly assigned to treatment groups, significant differences in performance were found on three pretest measures. The children assigned to the two experimental

Table 6

Means[1] and Standard Deviations on Pretest Measures, by Class

		Class							
		1 N=27	2 N=28	3 N=13	4 N=10	5 N=18	6 N=15	7[2] N=12	Total
Goodenough	M	4.0	3.7	5.7	6.3*	3.0	5.2	2.5	4.2
	SD	3.7	3.9	2.9	3.0	4.0	3.2	1.0	3.6
Columbia	M	30.1	35.1	29.2	36.9	34.8	34.1	30.8	32.9
Maturity	SD	10.1	8.4	11.9	11.6	13.9	11.7	10.1	11.0
Frostig I	M	6.3	6.3	5.2	5.7	5.4	5.4	4.5	5.7
Vis-Motor	SD	2.8	2.7	2.8	2.9	2.9	2.9	1.7	2.7
Frostig V	M	.6	.3	.3	.3	.3	.5	.8	.4
Spat.Relat.	SD	.8	.5	.5	.5	.5	.5	.6	.6
Shapes & Color	M	74.6*	55.9	72.9	72.5	63.6	77.1*	53.1	66.6
	SD	22.2	16.2	21.0	25.9	25.4	20.0	17.5	22.3
Same-Different	M	21.4	21.0	21.3	23.5	21.0	21.8	19.6	21.3
	SD	5.3	4.8	4.4	4.9	4.1	5.4	.9	4.6

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[1] All figures refer to raw scores

[2] Scores estimated from post-test data

* p.< .5

Table 7

Means[1] and Standard Deviations on Pretest Measures by Treatment

		Teacher Instruction N=45	Home Instruction N=48	Control N=30[2]	F Ratio
Goodenough	M	3.6	5.7	2.5	9.1**
	SD	3.8	3.5	1.9	
Columbia	M	32.0	34.6	31.7	.9
	SD	11.9	10.2	10.7	
Frostig I	M	6.0	5.9	5.1	1.0
	SD	2.8	2.9	2.2	
Frostig V Spat.Relat.	M	.5	.4	.5	1.0
	SD	.7	.5	.6	
Shapes & Colors	M	70.2	68.8	57.7	3.3**
	SD	23.9	22.7	17.0	
Same-Different	M	21.2	22.1	17.8	7.7**
	SD	4.8	4.9	4.9	

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[1] All figures refer to raw scores

[2] Includes 12 children for whom pretest data was estimated from posttests

** $p < .01$

treatment groups (Home instruction and Teacher Instruction) performed significantly better ($p. < .01$) than their Control counterparts on tests of Same-Different and Shapes-and-Colors, and the Goodenough Draw-A-Man Test.

These differences did not hold on the Frostig subtests for visual motor functioning or on the Columbia Mental Maturity Test.

(b) Posttests: The battery of tests given upon completion of the first year's study program included all of the pretest measures. Two of these, the Same-Different and the Shapes-and-Colors tests, were given in abridged and revised forms, but dealt with the same material as the pretests.

Four additional measures were included in the posttest battery. A matrix test was designed to measure ability in dealing with information presented in matrix form. This skill had been taught during the year as part of the program in problem-solving.

Two measures of transfer of learning were included, neither of which dealt specifically with skills taught during the year. They were Part IV of the Frostig Test of Visual Perception, which deals with perception of position-in-space, and the "Mahagar", the Israeli version of the Caldwell-Soule Preschool Inventory.

A test of family involvement (Family Story Test) was devised to assess differences in levels of response to school demands between families of children in the Home Instruction and the Control treatment groups.

This test was administered only in the four classes in which there were both Home Instruction and Control children. A simplified, illustrated version of a story by Leah Goldberg was given to each of the children by the kindergarten teacher, with instructions to give it to Mother and return it the following day. Printed instructions to the mother requested that she read the story twice to her child and complete a short exercise given at the end of the story. The following day the materials were collected in school and each child was asked eight questions on the content of the story by an examiner.

Means and standard deviations on all measures for all children by treatment are given in Table 9. Analyses of variance of the posttest scores by treatment indicate that the Home Instruction treatment group performed significantly better than the Controls on six of the ten measures. On comparing the performance of the Home Instruction and the Teacher Instruction groups on the nine tests which both groups completed (the Teacher Instructed group was not given the Home Story test) we found that the Home Instruction group performed significantly better than the Teacher Instruction group on four of the nine measures.

In order to account for initial differences between the groups, prediction scores were computed for each child based on pretest performance and the following demographic variables:

Age of child
Sex of child
Classroom teacher

Home Instruction aide
Father's country of origin
Father's level of education
Mother's country of origin
Mother's level of education
Number of children in family
Total number of persons in home
Total number of rooms in home

Predicted scores were compared with actual posttest scores and the resulting residual scores were then submitted to an analysis of variance by treatments. Data for this analysis are presented in Table ~~10~~ 9. Significant differences in favor of the Home Instruction treatment were maintained for four of the ten measures. Analysis showed that the posttest differences on the Shapes and Colors and the Frostig I tests were not significant. On both these tests it was found that their pretest scores explained about 25% of the variance, accounting for the drop in the significance of posttest differences.

The residuals reported in Table ~~10~~ 9 reflect actual performance in terms of expected performance on posttest measures. The Home Instruction treatment children did better than expected on eight of the 10 measures, while the Controls exceeded expectations on three, and the Teacher Instruction group on only one test.

It had been suggested that, having allowed for differences in initial performance and in variables relating to demographic factors, there would be no difference between the three treatment groups. Table 10 summarizes the relationship between expected performance and actual test scores for

Table 8

Means[1] and Standard Deviations on Posttest Measures by Treatment

		Teacher Instruction N=45	Home Instruction N=48	Control N=30	F Ratio
Goodenough	M	11.0	10.5	9.0	1.6
	SD	5.3	4.6	4.6	
Columbia	M	50.4	51.9	46.8	1.9
	SD	12.5	8.5	13.0	
Frostig I (Visual-Motor)	M	9.5	10.4*	8.2	3.5
	SD	3.6	3.6	3.7	
Frostig IV (Position-in-Space)	M	2.4	2.4	2.2	0.9
	SD	0.9	0.9	0.9	
Frostig V (Spatial Relat.)	M	0.9	2.4**	0.9	12.9
	SD	1.3	1.7	1.5	
Same-Different	M	7.8*	10.0**	6.0	20.4
	SD	2.9	2.2	3.3	
Shapes & Colors	M	72.2*	86.4**	65.5	9.1
	SD	23.6	17.7	22.8	
Mahagar	M	51.3	46.3	47.4	1.1
	SD	13.5	19.2	17.6	
Matrix	M	11.0	12.8**	10.3	6.7
	SD	3.3	3.4	2.5	
Family Story Test Score	M	-	2.4**	1.0[2]	25.2
	SD	-	.9	1.1	

---

[1] All figures refer to raw scores

*$p < .05$
**$p < .01$

[2] N=18

Table 9

Means and Standard Deviations on Residuals, by Treatments

		Teacher Instruction N=45	Home Instruction N=48	Control N=30	F Ratio
Goodenough	M	-.01	-.04	.09	.0179
	SD	3.32	2.57	3.33	
Columbia	M	-.94	1.45	-.91	1.3891
	SD	8.89	6.16	8.09	
Frostig I	M	-.43	.52	-.19	1.7657
(Visual-Motor)	SD	2.46	2.23	2.99	
Frostig IV	M	.02	.06	-.13	.5568
(Position-in Space)	SD	.79	.82	.71	
Frostig V	M	-.17	.35	-.31	3.1760*
(Spatial-Relat.)	SD	1.12	1.20	1.54	
Same-Different	M	-.19	.90	-1.15	7.2518**
	SD	2.39	2.14	2.57	
Shapes & Colors	M	1.90	1.44	.55	.6908
	SD	14.11	13.39	14.83	
Mahagar	M	-.37	-.58	1.47	.3110
	SD	10.23	13.23	11.68	
Matrix	M	-.46	.83	-.63	3.8076*
	SD	2.70	2.64	2.67	
Family Story	M	n.g.	.55	-.29	12.3455**
Test Score	SD		.84	.94	

n.g. = Test not given

* $p < .05$
** $p < .01$

each of the treatments. A Chi-Square analysis of these differences indicates that the change in group performances was not equal ($p. < .01$). This can probably be attributed to the extent to which the Home Instruction treatment scores exceeded expectations.

Table 10

Summary of Relationship Between Posttest Scores and Expected Scores by Treatment

	+	-	
Teacher Instruction	1	8	9
Home Instruction	8	2	10
Control	3	7	10
	12	17	29

Evaluation of Learning in the Second Year (1970-1971):

(a) Early testing: A test of general intelligence, the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), was used early in the second year. Since testing lasted about 8 weeks, this was a record of the intellectual performance of the children at that point in the program, rather than a pretest for the second year of instruction.

Means and standard deviations were computed on all scores for each treatment group. An analysis of variance indicated that the Home Instruction group scored significantly higher than the other treatment groups on the total WPPSI ($p < .01$), and on the Performance subtest ($p < .01$).

Both the Control and Home Instruction children's scores on the Verbal measures were significantly better than the Teacher Instructed children's $(p < .01)$, and these surprisingly high verbal scores for the Control children probably accounted for the lack of significance between their total scores and those of the Home Instruction children (Table 11).

Table 11

Means and Standard Deviations on WPPSI Tests

Treatment Groups

		Home Instruction 1 & 2 years	Teacher Instruction 1 & 2 years	Controls	F.Ratio
		N=60	N=30	N=27	
WPPSI	M	91.81	82.1	92.0	6.0*
Verbal	SD	13.6	13.0	13.2	
WPPSI	M	92.5	92.5	88.6	5.03**
Perf.	SD	14.0	15.5	12.9	
WPPSI	M	91.3	80.3	88.9	6.40*
TOTAL	SD	14.0	13.5	13.7	

* $p < .05$ ** $p < .01$

The WPPSI scores were examined in a variety of treatment groupings. When the population was divided into all possible subgroups (2 years home instruction; 1 year home instruction; 2 years teacher instruction; 1 year teacher instruction; 1 year home instruction, then dropped; 2 years control), the analysis of variance indicated significant ($p < .003$) differences between groups.

On examination of the differential performance of these subtreatment groups, it became clear that the children in the teacher instruction class which was not located in the Hatikva Quarter, and with which we had stopped working at the end of the first year, had performed atypically. We ranked the total population on WPPSI performance levels and found that all but one of the children in this class were concentrated above the median.

The work of Minkowitz, Davis and Bashi (1972) suggests that it is possible to stratify Israeli children in terms of predicted school performance by analyzing certain demographic factors. The three strong predictive factors are level of education of parents, country of origin of parents, and number of children in the home.

Since we had indications that the children in the dropped teacher instruction class were atypical of our population, it was decided to examine their predicted school performance. The criteria demographic factors for all children were compared and the atypicality of this group was confirmed. It was therefore decided to exclude them from further followup and data analysis.

Examination of the interaction between sex and treatment on the WPPSI scores indicated main effects for treatment only, ($p < .01$) with

Table 12

Means and Standard Deviations on WPPSI Tests by 7 Treatment Groups

		Home Instruction			Teacher Instruction				
		1 yr. N=22	2 yrs. N=35	Followup N=6	1 yr. N=11	2 yrs. N=23	Followup N=20	Control	F.Ratio
WPPSI Verbal	M	93.32	90.71	81.00	83.36	84.73	98.57	92.42	3.28**
	SD	12.61	14.78	9.76	14.92	9.32	11.65	13.3	
WPPSI Performance	M	91.59	92.94	79.67	85.55	86.87	96.22	89.27	2.10*
	SD	16.81	12.77	3.08	16.45	10.16	11.96	12.61	
WPPSI IQ	M	91.73	90.91	78.33	82.91	83.87	98.00	86.46	3.49***
	SD	15.33	13.93	6.47	13.88	9.48	10.45	13.58	

---

* p. < .06

** p. < .005

*** p. < .003

no interaction effects.

(b) Posttests: The posttest battery included three measures, one of which was the Frostig V retest. The other two were the Minkowitz Test of Math Readiness and the Boehm Test of Concepts.

The Minkowitz Test of Math Readiness is a test of basic concepts and relationships in math. Developed and standardized in Israel, its purpose is to identify areas of strength and weakness at the beginning of first grade. It comprises six sections: counting, sets and fractions, ordinal numbers, one-to-one matching, conservation of quantity and arithmetic problems. A total score reflects the sum of the weighted subscores.

Means and standard deviations for all treatment groups on each of the Minkowitz scores are presented in Table 13. The Home Instruction groups scored highest on five of the seven Minkowitz subtests. While an analysis of variance on these scores indicated that the difference between treatment groups was not significant, a sign test performed on the medians did show significant superiority for the Home Instruction group on four of the seven subtests. A summary of these findings is presented in Table 14.

Table 13

Means and Standard Deviations on Minkowitz Test of Math Readiness by Treatment

		Home Instruction	Teacher Instruction	Control	F Ratio
		N=52	N=25	N=26	
Counting	M	53.6	50.8	52.3	.40
	SD	13.3	14.8	10.8	
Sets and Fractions	M	48.5	46.2	49.0	.49
	SD	12.0	9.0	11.2	
Ordinal Numbers	M	49.3	47.8	48.1	.19
	SD	11.9	10.3	11.3	1.91
One-to-One Matching	M	51.4	45.2	50.2	1.91
	SD	13.4	13.0	13.4	
Conservation of Quantity	M	49.2	46.4	45.4	1.65
	SD	10.5	9.4	8.0	
Arithmetic Problems	M	45.9	42.8	45.9	.66
	SD	12.3	11.3	11.5	
TOTAL	M	51.5	46.2	48.3	1.40
	SD	13.9	14.5	13.1	

Table 14

Minkowitz Test of Math Readiness

Significance of Sign Tests on the Medians

Counting	No significant difference
Sets and fractions	HI significantly higher ($p < .01$)
Ordinal numbers	No significant difference
One-to-one matching	HI significantly higher ($p < .01$)
Conservation of quantity	HI significantly higher ($p < .01$)
Arithmetic problems	No significant difference
TOTAL	HI significantly higher ($p < .02$)

The Boehm Test of Basic Concepts is designed to measure mastery of concepts considered necessary for achievement in the first years of school (Boehm, 1967). The concepts can be grouped into four context categories or summed for a total score. The categories are: Space, Quantity, Time, and Miscellaneous. The test was administered to groups of 2-3 children in a room adjacent to their classroom. Subtest and total scores were computed for all treatment groups. The Home Instruction treatment group performed significantly better ($p < .05$) on the Quantity items. While their performance on all other parts of the test was also high, it reached statistical significance only in terms of a sign test performed on the medians.

Means and standard deviations for all treatments on each of the Boehm scores are presented in Table 15. A summary of sign tests performed on median scores for the same data are presented in Table 16.

Table 15

The Boehm Test of Basic Concepts By Treatment Groups

		Home Instruction	Teacher Instruction	Control	F Ratio
		N=57	N=25	N=26	
Boehm - Space	M	17.6	16.2	17.3	1.56
	SD	3.5	3.5	3.2	
Boehm - Quantity	M	12.7	10.9	12.1	3.08*
	SD	3.0	2.9	3.3	
Boehm - Time	M	2.5	2.4	2.5	.14
	SD	1.3	1.1	1.0	
Boehm - Misc.	M	2.1	1.6	2.2	1.69
	SD	1.2	1.2	1.4	
Boehm - Total	M	35.1	31.1	34.3	2.40
	SD	7.6	7.4	7.7	

* p.< .05

Table 16

The Boehm Test of Basic Concepts

Significance of Sign Tests on the Medians

Subtest 1: Space	H.I. sig. higher ($p < .001$)
Subtest 2: Quantity	H.I. sig. higher ($p < .001$)
Subtest 3: Time	No significant difference
Subtest 4: Miscellaneous	No significant difference
Total	H.I. sig. higher ($p < .001$)

The Frostig V subset (Spatial Relations), which was administered for the third time, once again yielded highly significant differences between treatment groups (Table 17). A Newman-Keuls analysis on the difference between the means indicated that both the Home Instruction and the Teacher Instruction treatment groups performed significantly better than the control group ($p < .01$). The Home Instruction treatment group performed significantly better than the Teacher Instruction treatment group as well ($p < .05$).

Table 17

Frostig V Subtest: Spatial Relations-Comparison of Raw Scores Between Treatments

	Home Instruction	Home Instruction	Control	F Ratio
M	4.3	3.3	1.7	18.01**
SD	1.9	1.9	1.8	

** $p. < .01$.

In summary, the effects of Home Instruction at the end of the second year could be seen in measures of both intelligence and achievement. While differences between groups were generally small, the consistently better performance of the Home Instruction group suggested an overall effect which would be put to test as the children entered school.

Evaluation of Learning in the Third Year (1971-1972):

The children spread out to over twenty first-grade classes within and outside of the Hatikva Quarter in the third year. Evaluation measures were therefore, of necessity, limited to those children whose classes were accessible. (Alltests had always been administered in the school setting and we saw no reason to change this practice now.)

(a) Early measurement: Pretest were not administered to the children but their teachers were interviewed at the end of the first quarter of the year. The object was to gather information on both the children's adjustment to school and their initial school performance. The interview questions made it possible to rate the children in six areas: academic achievement, enthusiasm, persistence, sociability, initiative, and discipline. All the interviews were conducted by a non-staff experienced worker who had no knowledge of the children's previous or current status in the program.

During the interview, however, it became clear that the teachers themselves were aware of the children who were or had been involved in the program. This information had evidently been given them by parents and children.

For the 96 children rated, it was found that the Home Instruction treatment group excelled in academic achievement, enthusiasm and persistence. There were no significant differences between groups in sociability, initiative or discipline. Table 18 presents a summary of sign tests performed on median scores for these variables.

Table 18

Significance of Sign Tests on Medians for the Teacher Interviews

Academic Achievement	H.I. sig. higher ($p < .01$)
Enthusiasm	H.I. sig. higher ($p < .01$)
Persistence	H.I. sig. higher ($p < .05$)
Sociability	No significant difference
Initiative	No significant difference
Discipline	No significant difference

Posttests: Two measures were used for the third year posttest period: the Milcan, an Israeli intelligence test for Grades One to Four, and the full Frostig Test of Visual Perception.

The Milcan is a group-administered test, which comprises three subtests: (1) Word recognition, (2) Seriation and (3) Symbols. It includes norms both by class levels and by age for ages 5.8 - 10.0. The test was administered in the children's classrooms to groups of 12 - 15 children during the final month of the school year.

Subtest scores and total IQ scores were computed for all children. Table 19 presents a summary of these data by treatment groups. Each treatment group includes all the children who had that treatment at any time. (Some of these are listed as "followup" in Table 5). An analysis of variance performed on Milcan scores indicated that while the Home Instruction children excelled on all measures that were significantly higher on the total IQ measure only ($p<.05$).

Table 19

Milcan: Comparison of all scores between Treatments

		Home Instruction	Teacher Instruction	Control	F Ratio
Vocabulary	M	8.244	7.519	7.667	1.40
	SD	2.080	1.784	1.447	
Signs	M	9.733	8.741	9.600	1.17
	SD	2.791	2.443	2.995	
Seriation	M	9.867	8.519	9.000	2.87
	SD	2.332	2.293	2.619	
IQ	M	93.622	86.704	90.200	3.45*
	SD	11.146	11.152	9.451	

* $p.<.05$

The Marianne Frostig Developmental Test of Visual Perception includes five subtests relating to different areas of visual perception performance: (1) Eye-Motor Coordination, (2) Figure-Ground, (3) Constancy of Shape, (4) Position in Space and (5) Spatial Relations. The full test was administered following the Milcan, to groups of 12-15 children in their classrooms. Scores for each of the subtests as well as a Perceptual Quotient for each child were computed. A comparison between treatment groups showed superior performance of the Home Instruction group on all scores. Table 20 presents scores for these measures for children who had at least two years of instruction.

Teachers' end of the year assessments of the children's work as reported in their report cards were recorded as an additional indication of achievement at that point in time. All the teachers tended to rate the children very high in all areas. This is evidently considered encouraging to the children and is therefore an almost universal practice.

While scoring systems varied from school to school, it was possible to equate them, giving scores of High=1, Medium=2, and Low=3. In a comparison of children who had had two years or more of home instruction with children who had not had any home instruction, (this includes the Teacher Instruction group), we found the Home Instruction groups scored consistently higher in the three basic subjects: reading, writing, and arithmetic (Table 21). Differences between the groups were significant ($p < .05$) for arithmetic scores.

Table 20

Frostig Developmental Test of Visual Perception

Comparison between treatment groups after two years of instruction

		Home Instruction	Teacher Instruction	Control	F Ratio
Subtests:					
I Eye-Motor	M	16.31	15.90	14.93	0.77
Coordination	SD	2.62	4.41	4.27	
II Figure -	M	15.55	15.60	12.47	3.15*
Ground	SD	4.14	3.95	3.98	
III Constancy	M	7.69	6.70	6.33	6.22***
of Shape	SD	4.36	3.43	3.77	
IV Position	M	6.41	5.50	4.87	8.21**
in Space	SD	1.24	.97	1.36	
V Spatial	M	6.04	5.00	4.40	5.26**
Relations	SD	1.26	2.00	1.96	
Perceptual	M	98.41	91.70	84.73	4.74**
Quotient	SD	13.17	15.97	14.63	

*** p. ∠.01

** p. ∠.05

* p. ∠.06

~~Teachers' end of the year assessments of the children's work as reported in their report cards were recorded as an additional indication of achievement at that point in time. All the teachers tended to rate the children very high in all areas. This is evidently considered encouraging to the children and is therefore an almost universal practice.~~

~~While scoring systems varied from school to school, it was possible to equate them, giving scores of High=1, Medium=2 and Low=3. In a comparison of children who had had two years or more of Home Instruction with children who had not had any home instruction (this includes the Teacher Instruction group), we found the Home Instruction groups scored consistently higher in the three basic subjects: reading, writing, and arithmetic (Table 24). Differences between the groups were significant (p.$<$.05) for arithmetic scores.~~

Table 21

Grades on Report Cards at the End of First Grade

Subjects		Home Instruction 2 & 3 Years N=37	No Home Instruction N=45	F ratio
Reading				
	M	1.41	1.58	1.61
	SD	.55	.66	
Writing				
	M	1.47	1.70	2.94
	SD	.56	.60	
Arithmetic				
	M	1.41	1.71	4.72*
	SD	.55	.70	

* $p < .05$

Cumulative Effects of Learning:

The cumulative effects of treatment for the Home Instruction groups were of special interest to us. There were five different Home Instruction groupings over the years:

(1) Children who began at 4 years of age in 1969 and participated for 3 years

(2) Children who began at 4 years of age in 1969 and participated for 2 years

(3) Children who began at 4 years of age in 1969 and participated for 1 year

(4) Children who began at 5 years of age in 1970 and participated for 2 years

(5) Children who began at 5 years of age in 1970 and participated for 1 year.

In general, the children who stopped after a single year of instruction either moved out of the neighborhood or were 'dropouts'. The latter were generally atypical of the total experimental population and, as has been mentioned earlier, comprised a very small percentage of it.

The data for the third year's evaluation were grouped by periods of instruction for the children in the Home Instruction treatment who had had at least two years of instruction. (Table 21). From these data it appears that there are no differences on any of the measures between these groups. This point should be considered in terms of findings reported above which indicate significant differences between the Home Instruction group as a whole and other treatment groups.

In summary, the experimental children apparently entered school with a greater level of readiness, as indicated by teachers' early assessments. Their advantage was maintained throughout the year, as can be seen from the summary of their report card grades.

The Home Instruction children performed significantly better than the Teacher Instruction and Control Children at the end of First Grade in two areas of general ability, intelligence and perception. The Teacher Instruction children reflected the effects of the special program only on the Frostig test of perceptual abilities.

The general impression at the end of the third year of instruction was that Home Instruction children were clearly showing effects of the experimental treatment while the benefit to the Teacher Instruction group was minimal.

Table 22

Cumulative Effects of Home Instruction with Different Points of Entry

		3 yrs: Ages 4-6	2 yrs: Ages 5-6	2 years: Ages 4-5	F Ratio
		n=20	n=9	n=7	
MILCAN					
Vocabulary	M	8.21	8.00	8.59	.14
	SD	2.04	2.00	2.64	
Signs	M	9.74	9.22	10.57	.38
	SD	2.86	3.23	3.46	
Seriation	M	10.42	10.89	8.86	1.56
	SD	2.57	1.90	2.41	
IQ	M	94.58	94.22	94.71	.004
	SD	12.08	11.60	12.19	
FROSTIG					
I Eye-Motor Coordination	M	16.70	15.44	14.40	1.39
	SD	2.98	1.33	5.03	
II Figure-Ground	M	14.90	17.00	14.00	1.08
	SD	3.74	4.82	4.64	
III Constancy of Shape	M	7.85	7.33	6.40	0.22
	SD	4.16	5.02	4.72	
IV Position in Space	M	6.55	6.11	5.60	0.49
	SD	1.32	1.05	2.30	
V Spatial Relations	M	5.95	6.22	5.60	0.35
	SD	1.43	.83	1.67	
Perceptual Quotient	M	99.25	96.56	88.60	1.06
	SD	13.93	11.85	21.59	

Evaluation of Learning in the Fourth Year (1972-1973)

No contact was made with the children while they were in Second Grade. At the end of the year (June, 1973) two tests of achievement were administered in those classes which had been used in the previous year's evaluation. Of 96 children listed, 81 were available for testing.

The tests used for evaluation in the fourth year were the Ortar-Ben-Shachar Standardized Reading Comprehension Test for the Second Grade (Mivchan Havanat Hanikra) and the Minkowitz Math Achievement Test for the Second Grade. The latter was developed at the Hebrew University for use with disadvantaged pupils in Israel, but has not yet been standardized.

Scores for all treatment groups on both tests are presented in Table 25. Maximum scores possible were 100 for the Reading Comprehension and 136 for the Math Achievement. A two-way analysis of variance between groups with treatment and sex as independent variables, yielded no differences for sex. Differences for treatment were significant at the .08 level. The F-ratios listed in Table 25 reflect effect of treatment in this analysis. There was a relatively wide range of scores for all groups. Children who had two or more years of Home Instruction performed best while those who had been selected for Home Instruction but dropped out during or at the end of their first year, performed least well. Differences between Teacher Instruction groups and the Control group were small.

Table 23

Followup Tests at the End of Second Grade

Means & Standard Deviations for All Treatment Groups

	HI	HI	HI	HI	TI	TI	C	
Tests	Ages 4-6	Ages 5-6	Ages 4-5	One yr or less	Ages 5-6	Ages 4-6		F Ratio
	N=18	N=8	N=5	N=9	N=18	N=11	N=12	
Math								
M	82.94	84.75	82.40	46.78	69.24	58.91	68.23	2.13*
SD	33.52	27.31	32.35	28.79	33.03	24.31	30.01	
Reading Comprehension								
M	83.33	83.75	84.00	61.11	76.47	74.09	73.85	
SD	16.72	13.03	10.84	23.56	18.61	18.41	18.39	1.98**

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* p.< .06

**p.< .08

Children who were in the Home Instruction treatment for one year or less performed least well. It may be suggested that this group represents "failures", who dropped out of the program because of initial low levels of ability. Excluding them from the final comparison would then inflate the Home Instruction group's score as against the other's. Examination of these children's early scores in comparison with those of children who had no Home Instruction indicate insignificant differences between groups at that time. Table 24 presents scores for the Home Instruction group and the No Home Instruction children for three early measures: WPPSI, Boehm, and Math Readiness (Minkowitz).

Table 24

A Comparison of Early Test Measures for Home Instruction and No Home Instruction Groups

		One Year Home Instruction	No Home Instruction
WPPSI	M	83.44	85.69
	SD	12.59	12.56
Boehm	M	35.2	32.7
	SD	7.6	8.0
Math Readiness	M	51.5	48.3
	SD	13.8	13.6

It would thus appear that it was not relative lack of ability or intelligence which accounts for the dropout's low Second Grade scores. Examination of reports of the aides indicates that all these children were from disrupted and malfunctioning families, and their withdrawal from the program resulted from their inability to work within its required organizational constraints. It seems likely, though as yet untested, that such family variables may be interfering with these children's school achievement as well.

Combining the children into major groups - those who had home instruction and those who did not - provides further insights into the effects of treatment.

A comparison of children who had home instruction for two or more years with all children who had no home instruction (including the TI group) is presented in Table 25. The differences between groups is significant at the .03 level for math achievement and the .02 level for reading.

The dropouts - those nine children who had less than one year of home instruction - reduces the effect of treatment but does not eliminate it (Table 26). For both measures, the HI children score higher than the NHI children.

Differences between the three home instruction groups were very small on both measures. This was somewhat surprising, as it had been expected that an earlier start and longer home instruction would produce greater and more lasting effects on school achievement. It should be noted here that for children who stopped instruction at age five, this testing period represented a follow-up after two years of no instruction, making their level of achievement more impressive.

It is commonly suggested that there has been a rise in the general level of school performance for disadvantaged Israeli children

Table 25

Comparison of math and reading scores for HI & NHI children at the end of Second Grade

	HI n= 31	NHI n= 41	F
Reading	83.55	75.00	4.64*
	14.62	18.06	
Math	83.32	66.15	5.74**
	30.84	29.57	

* $p < .03$

** $p < .02$

Table 26

Comparison of math and reading scores for HI & NHI children at the end of Second Grade, including drop-outs

		HI n= 10	NHI n= 41	F
Reading	M	78.50	75.00	0.71*
	SD	19.19	18.06	
Math	M	75.10	66.15	1.61*
	SD	33.77	29.57	

* [redacted] N.S.

in the past few years. Examination of the test performance of children in our sample lends credence to this idea.

The Ortar-Ben-Shachar Reading Comprehension Test provides norms for each grade, according to type of school (disadvantaged or regular). A standard score of 70 is considered the norm for any one scale, putting the Home Instruction children above the 83rd percentile for the disadvantaged, with the dropouts below the norm, and all others above the 73rd percentile. The mean of the combined scores for all groups (76.23) is considerably above the norm for the disadvantaged, but when the combined scores are interpreted on the scale of norms for middle class schools, they fall below the norm (65%). Interestingly, the Home Instruction children's performance is at the norm expected of middle class children (70%), while the others are at the 60th percentile for this set of norms.

While the Minkowitz Math Achievement Test has not yet been standardized on a large population, a comparison of the results of our testing with that done on the original sample used in developing test norms indicated similar differences. Only this one-year drop-out group performed at the level of the Control group in the original sample. All other groups in that sample received special math instruction, yet their mean score of 63.08 is lower than our uninstructed Control group. Thus on both measures used, the HIPPY sample shows superior performance, suggesting that there has indeed been a shift upward in achievement levels for all children.

Even with the upward shift in general performance level, children who had two years or more of Home Instruction performed consistently better than all other children on measures of Math Achievement and Reading Comprehension. These findings, while confirming our expectation that the effects of Home Instruction will be clearly visible in school performance and will be of a lasting nature, are somewhat surprising when seen against the backdrop of previous test scores.

Reports to date on research of classroom intervention projects indicate an almost universal trend toward large immediate gains, with gradual decrease in differences between experimental and control groups over time. The HIPPY home-instruction program appears to have had a different effect. Early consistent but small gains produced greater achievement at the end of second grade than would have been expected on the basis of these other researchers' findings alone. Continued follow-up on this group will indicate whether the gains are indeed stable and indicative of a special contribution of the HIPPY program to the early education of disadvantaged children.

FIELD ASSESSMENTS:

An examination of the feasibility of the program and the problems involved in its administration at home by non-professional aides must, by the very nature of the situation, rely on non-statistical findings. Our main sources of information relating to the operation of the program were: (1) written and oral reports of the aides, (2) observations and reports of the field coordinator and of the project director, (3) interviews with parents during routine visits by the field coordinator and by the project director

(4) reports of the classroom teachers, and (5) cue sorts on specific questions submitted to the aides.

Field assessment focused separately on the home, the aides, the teachers and the coordinator.

The Home as a Setting for Instruction:

It has been suggested that families in a poverty area would not necessarily welcome the additional burden of a home-instruction program, and would react to the whole idea as an imposition upon them. Notification was sent to the homes prior to initial visits by the aide and field coordinator, but there was no way of knowing how it would be received. It soon became apparent, however, that the neighborhood parents were enthusiastic about the idea of their children being given additional instruction, and were prepared to assume responsibility for their share in the program. The coordinator and aide were welcomed. In only a few instances did they sense any hesitation about participation on the part of the parents. On the contrary, some unpleasantness was created by the fact that within a very small residential area some children had been selected for what would appear to be preferential treatment.

Word got around. When the aides appeared on the scene, their arrival was heralded from balcony to doorstep. Women came out to ask why their children were not included. "What's wrong? Isn't my child a child of the State? Isn't he good enough? Doesn't he deserve your program? Just come, you'll see how we'll work!"

All the families selected for experimental home instruction agreed to participate, though a few failed to reach minimum criteria for acceptance (age, regularity of kindergarten attendance, etc.) and subsequently had to be rejected. The following two anecdotes are indicative of initial reactions to the program:

Peri: Family of eleven. Small shack, one room, outside toilet. Dirt, neglect, very old mother: "You'll see, we'll learn. The big girl will help. Now you see our house, you say, "Poor things," and you won't come. Just say when you'll come and we'll clear the table, we'll put the Sabbath tablecloth on, we'll sit quietly and learn. Swear on the Bible you'll come".

Yaffa: Family of nine. Mother is in bed awaiting an operation. "Teach me over here, next to the bed, and I'll teach Yaffa. When I go to the hospital her older sister will teach her and her father will see that she learns well. It's a shame that because I'm sick Yaffa won't be educated."

While the experimental program focused on the mother, there were six instances over the years in which the father or someone else assumed responsibility for instruction instead of the mother. In each such case there were pressing reasons for this (mother absent, retarded, etc.). Thus three fathers, two neighbours, and one grandmother were accepted as home instructors (9% of the program population). All the fathers and one of the neighbours were unsuccessful in their role of home instructor and dropped out at the end of their first year of instruction. During the three year period, on the other hand, 92% of the mothers successfully sustained this role for more than one year.

Whereas mothers were seen as being responsible for the program's implementation in the home, in 30% of the families the aid of older siblings literate enough to handle the instructional materials was enlisted. In the remaining 61% of the families, the mother assumed the teaching role alone. These figures do not include three families where the mother assumed complete responsibility in the third year only, when the teaching sibling was no longer available.

It took some time for most of the families to work into the routine of the aide's weekly visit, followed by daily family sessions with the child. During the early weeks of the program it was not uncommon for an aide to arrive at the appointed time and find no one at home. Later on, as the mothers became accustomed to the program, they made increasing efforts to be prepared for the lesson. Such preparations included tidying the room, clearing the table, and even putting a fresh tablecloth on it, as well as completing household chores before the aide's arrival. Frequently, the whole family awaited the aide and received her enthusiastically.

Families who began the program in the second year required a similar period of "settling in". The aides, for whom this was now familiar routine, were able to anticipate problems and make suggestions which frequently expedited adjustment to the program.

It was difficult to systematically gather information on the effect of the program on the families. Anecdotal data from visits, discussions, and observations, however, point to various developments. Mothers and fathers went out of their way to discuss "new techniques" they had developed for teaching their children. These included the use of a variety of materials not suggested in the planned lessons, methods of incorporating new ideas into games, and taking the child on trips to see things mentioned in lessons. In some homes we noted that parents and older siblings had begun buying books, toys, pencils and paper. For the first time these were assigned a place of their own in the home.

Lesson time presented a special challenge. Younger children and siblings close in age to the one being taught wanted to participate as well. We were able to help with this by providing extra materials for the use of these children, but it was the parents who had to manage their distribution so as to keep everyone happy during lessons.

In most homes all family members participated in the daily lesson. This probably was a natural result of the close living quarters, but as a result, the program affected more than the instructed child and his mother. In one home there was a major change in routine, with the husband putting the baby to bed early so there would be no disturbance during the lesson. In another, the aide arrived for the weekly lesson and found her pupil sitting among his brothers and sisters "reading" to them from his story book.

In one family, a retarded eight-year-old sibling began to show an interest in the materials. His mother was eager to instruct him and we supplied her with additional weekly lessons for him. Subsequent testing by the school psychologist indicated spurts of cognitive growth which the parents linked to the boy's use of our materials.

The flexibility of the home instruction setting became increasingly evident over the years. In contrast to the school, where education is restricted by the physical setting, the hours, and the large numbers of children, home instruction is relatively easily adaptable to the child's schedule and the demands of the environment. This flexibility of scheduling, the continuity of the study, and the general family environment which seems to occur when the home is the center of instruction outweighed most of the difficulties we encountered.

Interruptions caused by family celebration of major events, such as births and bar-mitzvahs, were counter-balanced by the fact that, unlike school routine, home instruction does not stop during a child's illness. In no instance did a child fall behind because of illness. On the contrary, it was while the child was at home for several days at a time that the mothers became most appreciative of the materials we had provided. One child was hospitalized for three weeks, but his instruction continued during his mother's daily visits.

The field coordinator visited each child's home several times during each school year. In all instances she was received warmly, and almost without exception, every effort was made to show how much the program was appreciated and in use. Parents told of family meetings in which children in the program were compared with their cousins who were not participating, and indicated the pride with which their own children performed. In a community where large families abound and family ties spread far, news of the program travelled quickly. There was constant pressure on the aides and the field coordinator to explain why one child or another was excluded from the program.

We had anticipated that major problems in using the home as a center of instruction would begin to appear as initial enthusiasm waned. In the course of the three years, however, relatively few problems arose. In the few families where we found parents uncooperative, the disruption appeared to be caused more by the state of general disorder and tension in the home than by opposition to the program itself. Instruction for these families was terminated during the first year of their participation in the program. This hard core of "unteachable" families represented 10% of the experimental population.

During the second year of the program we set about looking for evidence on the different ways the program was operating in the homes. A cue-sort technique was employed, in which each aide sorted the families in general and on their specific relationships with the program.

In analyzing the results of the cue-sort, we found that certain items tended to cluster, reflecting a general response pattern to the program. This varied from a responsible and determined approach to one of apathy and neglect. Further analysis of these data indicated that in families whose response patterns clustered along a high-involvement dimension, children's test performance on cognitive measures tended to be high as well. Conversely, in low-involvement families children tended to perform poorly on the cognitive measures.

The evidence of the relationship between home involvement in the program and the children's cognitive performance is of special interest insofar as it suggests that a family's ability to organize itself around a home instruction program such as HIPPY may be a factor in the child's cognitive functioning.

After the end of each year of instruction the coordinator visited all the home instruction families. The objectives of this visit were threefold: (1) to present a diploma of participation, (2) to see how the children were occupying themselves during the long summer vacation, and (3) to learn more of the attitudes of the children and their families to the program, both in retrospect and in anticipation of the school year to follow.

The diplomas were received with pride, and were evidently important to the families. However, in many instances there was disappointment that the coordinator had brought no new exercises with her. The lessons were missed, and many families made an effort to provide a substitute. Some mothers brought story and drawing books at the local kiosk, otherscopied out old exercises for the child to repeat, and yet others gave the child the "mother's page" (instructions to the mother) from the old lessons to work on. The children, however, complained that these substitutes were not as good as the real lessons. There was a general request for summer vacation worksheets but, unfortunately, we were unable to meet this need.

The Mother as Instructor:

Using the mother as teacher presented few serious problems. At the beginning of the first year we became aware of several instances in which, in her eagerness to have the child succeed, a mother was punishing and pressuring the child to the point where the child showed ambivalence about the learning sessions. Fortunately, these situations came to light quite early and were, in general, easily brought under control.

We did not expect that the introduction of the HIPPY program into the home would revolutionize interaction patterns between mother and child. Ambivalent feelings toward the child, impatience, lack of empathy and understanding were frequently evident. But even where underlying tensions existed and there was little real understanding of the child's needs, we found that the mother could still be a successful home-instructor by following the aide's careful and detailed instructions.

For a few mothers, the written instructions were merely a jumping-off point, from which they drew ideas for new activities. In one family of nine living in a single room, the mother turned the materials into the focus of activity for the whole family. She found ways of using them to draw everyone together, while having each child utilize some part in his own way. She told us that having found herself successful as an instructor with the materials, she began to think about other areas of competence where she could be of help to her children. Thinking back to her school days in Persia she remembered that she had once been a good student of arithmetic. Knowing that she had a son with difficulties in this field, she started learning and relearning arithmetic from his books and eventually established herself as his tutor in arithmetic.

Together with their young children, some mothers found themselves learning basic academic skills for the first time. Mrs. C. started crying upon hearing the initial explanation of the project. "All my life I've been embarrassed to sign with my fingerprint. My husband has also been embarrassed. Now Tamar will be a scholar. Of course, I'll sit with her everyday, and I'll learn too. I wanted to go to evening school, but the children came one after the other and I couldn't go. Now we'll learn together." Another mother explained that because she was illiterate, other family members would have to help Eliyahu with the materials. "But," she said, "I've already learned what to do with some booklets and if there's no reading involved I can teach him too." She laughed and added: "I'm learning together with him." Yet a third mother bought a notebook into which she entered all the new words she came across, so as to build an improved Hebrew vocabulary for herself. She shared these with the aide each week.

Two mothers decided to enroll in evening classes shortly after the experimental program began. In both cases they said the decision was directly related to the new demands and challenges involved in teaching their children.

Where the mother was incapable of handling the teaching, and older siblings (aged 9-15) adopted the teaching role instead, they generally accepted this new and demanding family task with responsibility and persistence. Their own schoolwork was often so demanding as to interfere with regular and orderly home instruction. Parents frequently recognized this and in appreciation released these children from other tasks so that they could teach. In these families the mother usually participated passively in the lesson. The siblings took their teaching task quite seriously and more than one of them earnesly asked the aide at the end of the year whether she thought that the younger child would now do well in school.

The Aides:

After a short introductory training period with the instructional materials and their administration, the three aides found themselves face to face with the project families. They were given maximum leeway in seeking the right way to guide and encourage each mother to meet the demands of the program. Though totally new to the dual role of teacher and model to the mothers, they adapted to it quickly and effectively. Possibly due to the similarity in background, they were able to appreciate the difficulties facing a mother, but at the same time they seemed to know when to leave out the sympathy and push a mother to further efforts. There was no reticence in telling the mothers what they thought of their efforts or lack of them.

While working with a highly structured program, the aides found a variety of simple techniques for helping each mother to adapt the materials to her own specific abilities and home situation. The repetitiveness of the tasks did not appear to bother the aides. On the contrary, their success with them seemed to heighten their desire to do more.

From the beginning period, during which demands and expectations were established and clarified, a warm and respectful relationship developed between the aides and the mothers. The aides came to appreciate the mother's efforts without judging her by external conditions and only on rare occasions was the aide unable to reach a satisfactory relationship with the teaching member of the family. Furthermore, these relationships were retained and developed throughout the program. The mothers' concern for the aides was apparent in their distress when an aide had to walk from building to building in the cold winter weather, from their inquiries after an aide on those days when she was sick, and in the genuine sharing of joy at the birth of a son to one of the aides.

There was a gradual change in the aides' approach to their jobs over the course of time. A first sign of change was when they were able to develop satisfactory working relationships regardless of personal opinions of the family and its members. Feelings of involvement in their work became evident. When they observed troubles in the families - social or economic - they asked the coordinator to do what she could be render assistance, and in time the families began to discuss their problems with the aides. While this was not encouraged, the aides willingly agreed to act as links with what the families apparently considered the "outside powers".

It was expected that the aides' roles would affect their personal lives and attitudes. We found several indications of changes of this sort for each aide. One of them ashamed of her spelling mistakes and

and wanting to read and write correctly, has been attending evening classes. This same young war widow feels less satisfied with the intellectual level of the young men she knows and has changed the pattern of her social life accordingly.

Another aide involved all her family in the program. She prepared for her teaching by working with her own children and collected a complete set of materials for when her newborn baby would become of age. Her husband became enthusiastic about the program and said it was good for his wife. He took on extra chores in the house to enable her to be free for her work.

The third aide showed a dramatic increase in self-confidence. Of the three aides, she was originally the most hesitant, the most fearful of entering the homes and handling the questionable enthusiasm of the families. Her involvement in her work increased steadily, and reached the point where she turned down the offer of an easier job with better pay in order to remain in the program. This is the oldest of the aides, and she saved her teaching materials for her grandchildren.

Most of the data on the aides was gathered from their own weekly reports. Analysis of the cue-sort data and parent-interviews administered by the aides yielded additional and interesting dimensions to our view of the aides and of their work.

Response patterns of the aides on the cue-sort indicated that one of them was apparently unable to identify many differences between families in her care. This finding corresponded to the aide's own reports on her work, which showed her to be more rigid and demanding than the other two. Neither of these qualities, however, appeared to interfere with her success in teaching.

At the beginning of the second year, the aides were asked to complete a questionnaire on the reaction in each home to the program and to themselves. One question asked: "How does the mother view you?" From among the six possible responses (specialist, someone who knows more than she does, friend, someone to take advantage of, meddler), each aide consistently picked one response. The responses they chose were 'specialist' and 'friend'. Such consistency can be interpreted in two ways: (1) the aide had indeed acquired these status roles in the eyes of all participating mothers; and (2) the aides were describing their own view of their roles.

In reporting the children's views, the aides were equally consistent in ascribing to themselves the role of specialist. Graduate student interviews done in the homes confirm the aides' feelings that the families see them as authorities of some kind. The student interview data suggest that this develops at least in part because the parent builds that image for the child. A parent would say: "If you don't do...I'll tell the aide on you." Or: "If you finish, I'll tell the aide how well you worked." Parents thus seemed to use the aide to bolster their own authority as needed, and the authority with which they invested the aide would seem to be a contributing factor not only to her increased status in the community but to the way she subsequently came to view herself.

Spillover Effects Into the Classroom:

One way we had of learning what was happening to the children in the home-instruction group was through their kindergarten classroom teachers' account of progress. There was much overlap between the findings of the teachers. They found the HIPPY program children different in the following ways from groups of children previously taught by them.

1. In a mixed class of four and five year olds, the four-year old children who were part of the program showed greater alertness and responsiveness. On comparing the non-HIPPY five-year olds with the four-year-old group, the teacher found that the younger children were "stealing the show" in most areas of work and play. That is, the children in the research project were more adept in the use of didactic play materials, they shone in small group activity and appeared to be more alert and responsive to their environment. They frequently called out answers before the teacher could finish phrasing the questions. The teacher said: "I find it difficult to work with

the kindergartners on the regular curriculum when the four-year-olds are around, since the latter generally hover around the work tables and give answers before I have a chance to give full instructions to the kindergartners. This is a new phenomenon; in previous classes and even until recently the four-year-olds tended to ignore the older children during this 'lesson time'."

2. There was more active participation in story time and discussions: group discussions were active; little probing was necessary; simple hints were generally enough to evoke a flow of responses and explanations.

3. There was more incorporation of geometric concepts and shapes in their daily activities. Geometric shapes appeared frequently in the children's drawings. Yossie, one of the weaker children, sat alone, drawing different shapes and announcing, "Now I'm drawing a standing line, and this is a lying line. I already have a diagonal, soon I'll have another diagonal, I'm making them like a roof..."

4. The children were superior in their grasp and execution of tasks that required use of didactic materials. The HIPPY four-year-olds equalled kindergartners in grasping the problems involved in puzzles and didactic materials (matching, sorting, seriating). One teacher said she had only to demonstrate the task once and these children carried on with almost no further guidance.

Teacher Instruction:

The instructional materials were used by teachers in two classes as part of the regular school curriculum. This experimental condition was included as a means of examining the effectiveness of using the materials without involving either the mothers or the homes.

Several problems arose immediately. The teachers' initial reaction was to use all the materials exactly as they were prepared - an impossible task. The lessons were written for use on a one-to-one basis and each was estimated to last five to seven minutes or for a total of 15 minutes a day. When used in the larger group of seven to ten children, the mere technical processes (turning pages, distributing pencils, cutting pictures, etc.) took so long that the children's attention wandered and the material could not possibly be covered. Instead of focusing on the objectives of instruction, as we had expected them to do, the teachers were trying to follow the instructional program as planned, with little or no deviation. The materials were written for non-professionals and the slow step progressions precluded the necessity for ongoing judgments and teacher evaluation of learning. Our teachers, whom we expected to be capable of these professional judgments, were not availing themselves of their skills.

In an attempt to redirect their efforts to the basic objectives of the material, the field coordinator arranged to meet with the teachers weekly to discuss and plan the instructional program. At these meetings, the objectives of instruction were discussed in terms of classroom use. In the course of time, these sessions took on a more creative nature as the teachers grasped what was expected of them and how they could be helped by the materials.

The teachers differed in their ability to adapt the program materials to the classroom setting. They differed in levels of creativity and in the degree of independent effort they were able to invest in the success of the program. One teacher was much more dependent on the coordinator than the other, looking to her for guidance and instruction and following her directions explicitly. The other was more active, bringing suggestions of her own and not relying solely upon the coordinator for direction.

Reports from both teachers on the progress of children in their classes gave evidence that the coordinator's guidance had helped and that some innovative teaching was taking place. However, neither teacher was fully able to overcome the tendency to be bound by the written exercises, so that the classes covered only 60% of the instructional materials.

The Coordinator:

The model for the HIPPY program included a professional field coordinator. This role was seen as crucial to success in the use of indigenous, non-professional aides.

Whereas the role of the aides was highly structured and predetermined, the coordinator's job was never clearly defined. She was expected to act as local liaison between the university program staff and the field operation and to "trouble shoot" in the field. Additionally, she was selected so as to be qualified to give guidance and help to the aides in their work.

Evaluation of the work of the coordinator focused more on the analysis of the components of her work than on her effectiveness in her role. As expected, an important aspect of her work was observing and guiding the aides in their teaching roles. A common problem, for instance, was that an aide focused more on correcting behavior than in establishing initially correct behaviors. She would spend time telling a child what not do rather than what to do. This led to the mother's picking up a negative approach instead of the programmed and desired positive one.

Initially, much of the coordinator's effort focused on setting the program into motion. This involved stepping in where the aides met with lack of cooperation or were apparently having difficulty in getting a working relationship going with a family. As a professional, the coordinator was able to probe into and more specifically identify those areas which were creating problems.

In the course of time the coordinator assumed the additional role of social broker for families. Unlike the aides, who were of the community, the coordinator was seen as representative of the "outside" world. Problems in this area were generally brought to the coordinator's attention by the aides during their weekly reports. Thus, for example, an aide mentioned that an older sibling who was teaching Shimon had a bad stutter. The aide who was disturbed by this asked the coordinator if she could do anything about it. After checking at the school and finding that the older child had never been seen by the health services, the coordinator made arrangements for the child's stutter to be treated.

While the HIPPY program was first and foremost a home based program, there were occasions when the coordinator found it necessary to observe in the kindergarten classes so as to gather information on specific children.

Aviva, for example, was always too tired to concentrate on her lesson. The aide discussed this with the coordinator who decided to investigate further. On observing the child in kindergarten, she noticed that by the last school period the child was not participating.

She arranged with the teacher that once a week Aviva would leave kindergarten at 12:00 instead of 1:00 and be taken home by the aide for her lesson. This solution helped the child to perform more succesfully in our program.

In another instance, an aide noticed that Edna came home from kindergarten ravenously hungry. Concerned, she told this to the coordinator who found out that Edna was not receiving food at the kindergarten because he mother had not knownto request it. Since it was well after the start of the year, the child's name could no longer be added to the list, but the coordinator did persuade the teacher to give the child food in the kitchen every day before the othersate.

In addition to her work with the aides and the home instruction families, the coordinator worked closely with the teachers of the classes of the Teacher Instruction groups. As mentioned earlier, she met with these teachers regularly so as to help them understand the objectives of each unit of instruction and adapt the HIPPY materials to the classroom setting.

In her role of liaison between the field activities and the university program staff, the coordinator provided several essential services:

1. She provided feedback on the receiption and use of instructional materials which was then used in their ongoing modification.

2. She provided more information about the aides and the families than could be gotten from either the aides' written reports or their weekly training meetings with the director.

3. She acted as an ongoing interpreter of the objectives of the program to all field participants: aides, parents, teachers, community service workers, etc.

In general, it was clear that the coordinator acquired special status in the field. While considered an authority figure, she was liked and respected. She spent enough time in the neighborhood to become a familiar personage, while retaining her identity as representative of the University. This combination was apparently an effective one and might serve as a model for future programs.

SUMMARY

Three operational phases were scheduled for the HIPPY program: Program planning, program implementation, and follow-up. We are in the final phase and with a minimum of one year of follow-up data for all groups we are in a position to summarize some of the basic issues involved in the research.

The data reported herein have dealt with two basic questions: (1) the feasibility of a home-based program of instruction with the disadvantaged in Israel, administered by non-professional aides, and (2) the effectiveness of such a program as reflected in (a) the academic and intellectual gains of the children involved, and (b) the spillover effects to other members of the family and community.

The feasibility of a program can be evaluated in terms of the success of the operation of all its components and the degree to which the model used was appropriate for the population in question.

The HIPPY program incorporated mothers, non-professional aides, a professional coordinator, a director, kindergarten teachers and the use of structured materials. When combined for a home-instruction program these elements functioned very effectively. The problems which arose were never of a nature which impeded the operation of the program. When the HIPPY structured materials were used in the kindergarten classes, however, the situation was different. The materials were difficult to adapt to a classroom setting, and apparently served as a disruptive rather than an enriching element. It is very possible that this situation would have been different had the materials been reorganized and revised in advance for use in the classroom. This would have put less pressure on teachers, as they would have been free to concentrate on teaching rather than on adapting the materials for classroom use.

Evaluation of the feasibility of field-oriented research projects should include the degree to which any program depends upon the specific settings and personalities involved. It was clear that a major factor in the acceptance of HIPPY by the general public was the status associated with a university. To the same extent, much of the program's smooth operation may have been dependent on the drive and determination of the research staff. While we have not yet experimented with varying these factors in the program, they will have to be carefully monitored as local authorities get involved in HIPPY.

No program is suitable for all people and HIPPY is no exception. While the drop-out rate was consistently low, an examination of those families which did drop out suggested that they were different in many ways from families which were highly involved in the program.

Children from drop-out families scored consistently lower than all other groups (including controls) on measures of achievement. Their families were typically disorganized and frequently in a state of extreme flux.

Among those families which participated in the program for two years or more, similar relationships could be discerned between level of involvement, children's achievement and a constellation of home factors. These factors should be helpful in future selection of HIPPY participants, suggesting criteria for screening.

The effectiveness of the HIPPY program was examined under varying conditions: locus of instruction, duration of instruction, and point of entry into the program.

Locus of instruction was either the child's home or the child's kindergarten class. The evaluation of the relative effectiveness of the program when administered in the home as compared with its administration in the classroom was complicated by the fact that because of the difficulty of classroom administration the children in the Teacher Instruction treatment group did not cover the same amount of material as the Home Instruction group. However, whatever they had learned in using the HIPPY structured material in the classroom should have been reflected in a comparison of their scores with those of the control group. Examination of the first year data show differences on posttest scores, but these differences do not hold up in relation to predicted scores for each group.

Similar analyses have not yet been done on the data for the subsequent years. However, comparison of intellectual and academic achievement scores for the three groups (Home Instruction, Teacher Instruction, uninstructed Controls) gives clear indication that the Home Instruction treatment was consistently and significantly the most effective of the three. Comparison of the Teacher Instruction with the Control group does not yield such a pattern. Following the second year of instruction, children in the Control group performed better than those in the Teacher Instruction group. This relationship changed in the following two years, with neither of the two groups performing consistently better than the other.

Children in the Home Instruction group participated in the program for one, two, or three years. One year of instruction was apparently inadequate to produce effective learning, a finding consistent with other studies such as that of Karnes (1969) . It must be noted that most of the children who had only one year of instruction were children who dropped out at the end of the first year. As indicated earlier, these children evidently represented a different population from the other home instruction groups.

Contrary to our expectations, a comparison of children who had two years of home instruction with those who had three year of home instruction did not yield meaningful differences. It has been suggested that longer intervention has more lasting effects. In the case of the HIPPY program, however, the differential effects of the duration of instruction are not yet in evidence. Further follow-up testing may yield additional information in this area.

A basic premise in early intervention programs is that the earlier you begin the greater the impact. Approximately half the children who were in the program for two years started at age four and the other half at age five. Here too, comparison of test results at the end of first and second grades indicates no differences. One factor which may be at work here is that whereas children who participated for two years beginning at age four covered two years of instructional materials, those who began at age five covered three years, in an accelerated program. This may be construed to indicate more effective and lasting learning when instruction is begun earlier.

Several other variables may have contributed to the effectiveness of the Home Instruction treatment. The specific nature of the materials of instruction involved, the nature of the interaction between the aide and the family, the individualized attention given mothers on a weekly basis, and the status acquired by participation in a university-based research program, are four of the more obvious factors which might be manipulated in future replications of HIPPY so as to isolate their effects.

It is also possible that as yet unmeasured factors within families may account for the program's level of success. While such factors do not lend themselves to manipulation, careful observation and measurement of the impact of HIPPY on the dynamics of family life may be important. Such data will clarify what, if any, effect HIPPY has had on participating families. With these data we would also be in a position to suggest what family variables are important for children's academic success.

In considering spill-over effects, two areas of study seemed relevant: spillover to siblings within a family and spillover to non-participating members of the community.

Measurement of spill-over effects to siblings proved unfeasible for technical reasons. Reports of the aides suggest the existence of effects on older siblings who are involved in the teaching process as well as those on younger siblings. The actual evaluation of these two effects will be carried out in future replications of this study.

Evaluation of spill-over effects in the community was based on spontaneous on-going reports of all participants. From these it was evident that there had been some impact on the community. The exact nature and degree of this impact also awaits further study.

At the end of four years of HIPPY implementation and follow-up it is clear that this home-instruction model is effective in accelerating Israeli children's academic achievement in the early years. While several questions relating to the model have yet to be explored, the lasting effects of HIPPY are very encouraging.

APPENDIX

Sample of One Weekly Instructional Booklet

This sample is representative of the activities in the third week of the first year of participation. At the top of each page there is a reference to the week of study, the day of activity, and the subject of the activity.

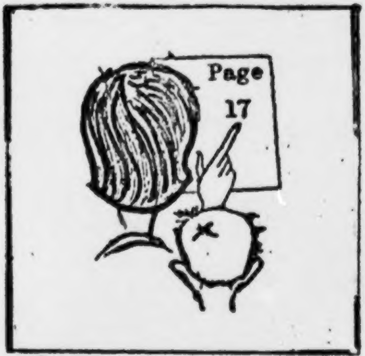
These ten activities deal with six subjects: a book (formal language), connecting dots (spatial relations, eye-hand coordinations), same-different (discriminations), matrix (problem-solving), front-back, and loud-soft (concept development).

Week: III - 1

Lesson: Joey's Bicycle INSTRUCTIONS

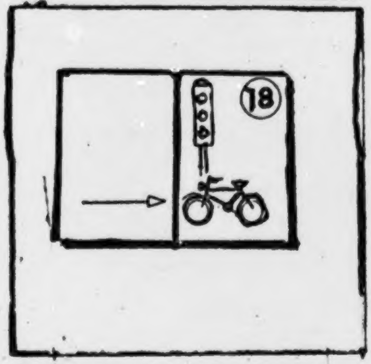
1. (Open the book "Nurit's Carriage and Joey's Bicycle" to page 17 and say:)

   WHEN A PERSON RIDES A BIKE HE HAS TO PUT OUT HIS ARM TO SHOW WHICH WAY HE IS TURNING. SHOW ME A PICTURE OF JOEY PUTTING OUT HIS ARM.



2. (Open the book to page 18 and say:)

   WHEN A PERSON GETS TO A TRAFFIC LIGHT HE LOOKS AT THE COLORS TO SEE WHETHER TO GO OR STOP. AT A RED LIGHT YOU STOP, AT A GREEN LIGHT YOU GO.

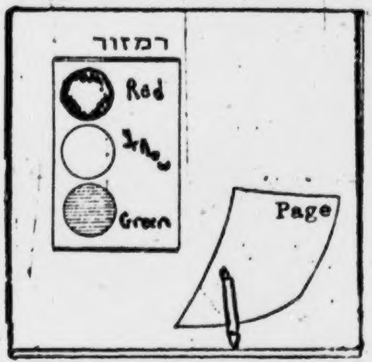


3. (Take out a clean sheet of paper and a pencil and say:)

   NOW WE ARE GOING TO PLAY A GAME.

   WHEN I SAY 'GREEN' - YOU'LL DRAW A LINE ON THE PAPER.

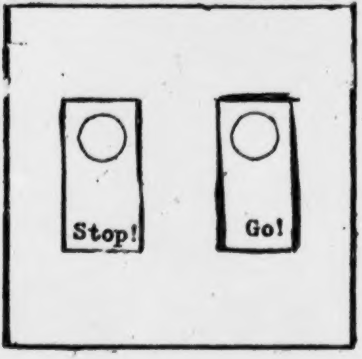
   WHEN I SAY 'RED' - YOU'LL STOP DRAWING.



4. (Take out two circles - one red, and one green, and say:)

   HERE'S A GREEN CIRCLE. DRAW A LINE.

   WHEN I SHOW YOU THE RED CIRCLE, STOP DRAWING.



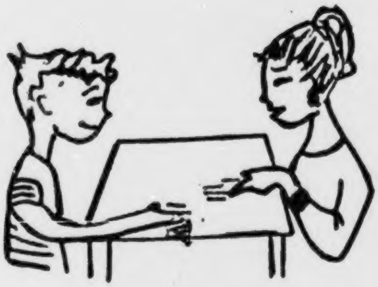
5. (Say:)

   NOW YOU SHOW ME THE SIGNS AND I'LL DRAW.

Week: III - 1

Lesson: Connect the Dots (1) INSTRUCTIONS

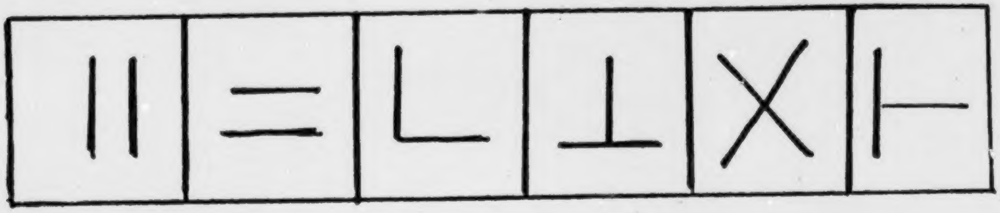
1. (Take 5 headless matches for yourself, and give 5 to your child.)



2. (Say:) NOW WE ARE GOING TO PLAY A MATCH GAME.

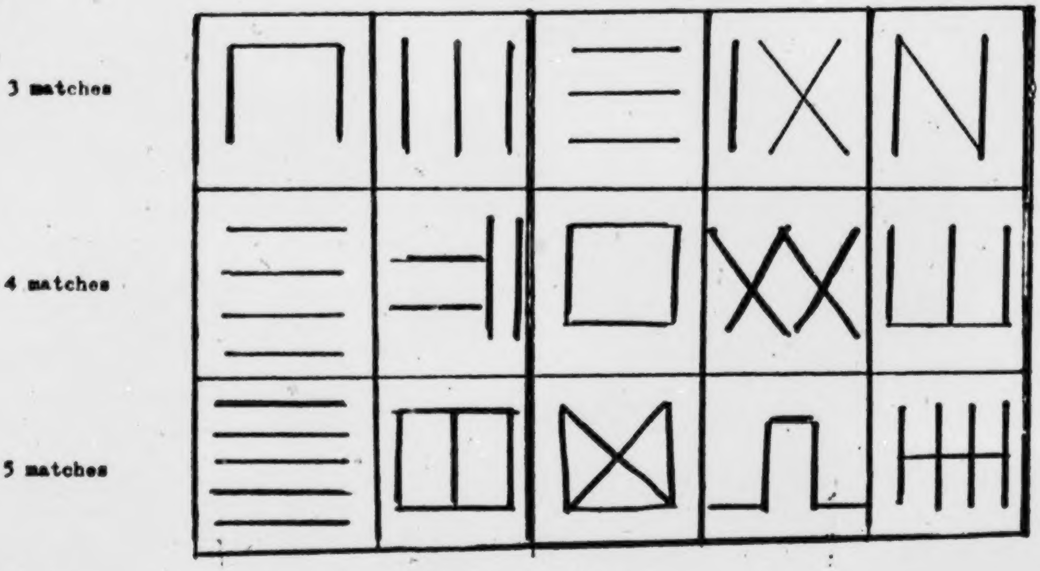
   (Put 2 matches on the table and say:) COPY THE WAY I ARRANGED MY MATCHES.

3. (Put 2 matches on the table and say:) COPY THE WAY I ARRANGED MY MATCHES.



4. (Say:) LET'S CONTINUE THE GAME WITH MORE MATCHES. KEEP ARRANGING YOUR MATCHES THE WAY I DO.

EXAMPLES FOR MATCH PATTERNS



Week III - 2
Lesson: Front - Back (2)

INSTRUCTIONS

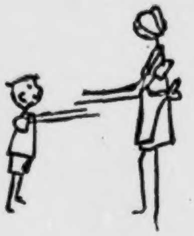
1. (Say and Do.)
DO WHAT I DO.

HANDS IN FRONT

HANDS IN BACK

HANDS IN FRONT

HANDS IN FRONT



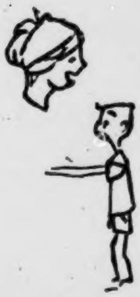
2. (Say but don't do.)
DO WHAT I SAY.

HANDS IN FRONT

HANDS IN BACK

HANDS IN BACK

HANDS IN FRONT



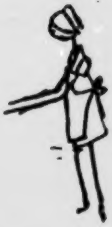
3. (Stand facing the child.) TELL ME WHAT I'M DOING.

a. (hands in back) ARE MY HANDS IN FRONT OR BACK? - in back

b. (hands in front) ARE MY HANDS IN FRONT OR BACK? - in front

c. (hands in front) ARE MY HANDS IN FRONT OR BACK? - in front

d. (hands in back) ARE MY HANDS IN FRONT OR BACK? - in back



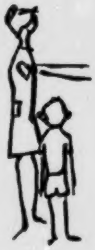
4. (Turn sideways, so the child sees you from the side.)

a. (hands in back) WHERE ARE MY HANDS? - in back

b. (hands in front) WHERE ARE MY HANDS? - in front

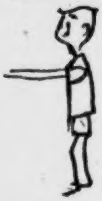
c. (hands in front) WHERE ARE MY HANDS NOW? - in front

d. (hands in back) WHERE ARE MY HANDS NOW? - in back

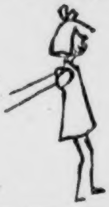


5. (turn towards the other side and do the same thing.)

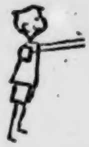
LOOK AT THESE PICTURES AND PUT YOUR HANDS LIKE THE CHILD'S IN THE PICTURE.



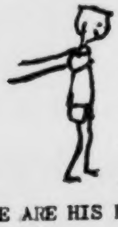
WHERE ARE HIS HANDS,
IN FRONT OR IN BACK?
DO THE SAME THING.



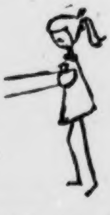
WHERE ARE HER HANDS,
IN FRONT OR IN BACK?
DO THE SAME THING.



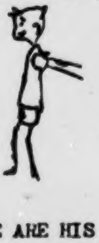
WHERE ARE HIS HANDS,
IN FRONT OR IN BACK?
DO THE SAME THING.



WHERE ARE HIS HANDS NOW?
COPY HIM.



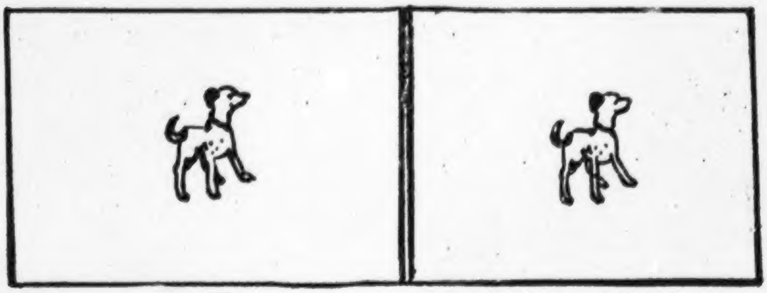
WHERE ARE HER HANDS NOW?
COPY HER.



WHERE ARE HIS HANDS
NOW? COPY HIM.

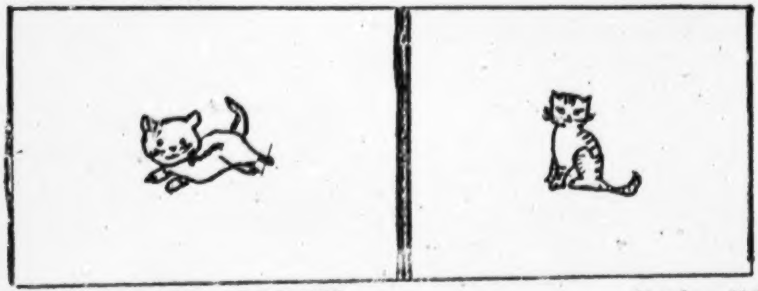
Week III - 2
Lesson: Same - Different (7)

WORK SHEET I



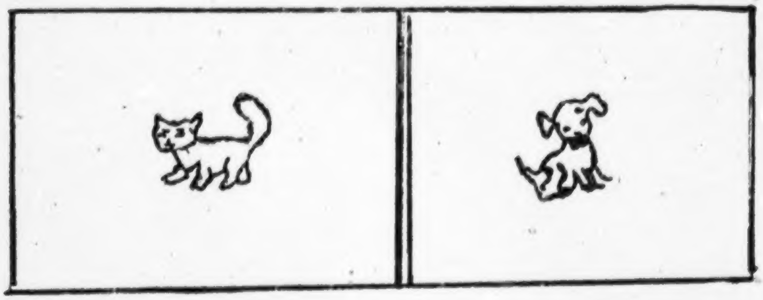
1. ARE THE PICTURES THE SAME OR DIFFERENT? - the same.

2. HOW ARE YOU GOING TO COLOR THE IDENTICAL PICTURES? - with the same color.
COLOR THEM THE SAME COLOR..



1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're different.

2. HOW ARE YOU GOING TO COLOR DIFFERENT PICTURES? - with different colors.
COLOR THEM DIFFERENT COLORS.

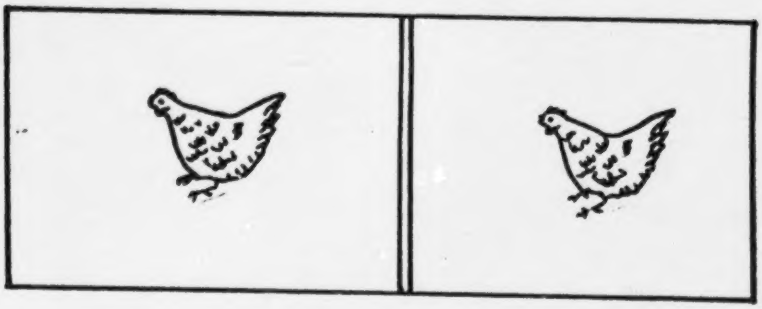


1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're different.

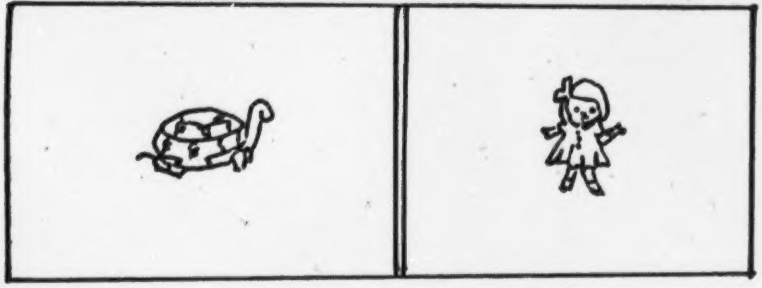
2. HOW ARE YOU GOING TO COLOR DIFFERENT PICTURES? - with different colors.
COLOR THEM.

Week III - 2
Lesson: Same - Different (7)

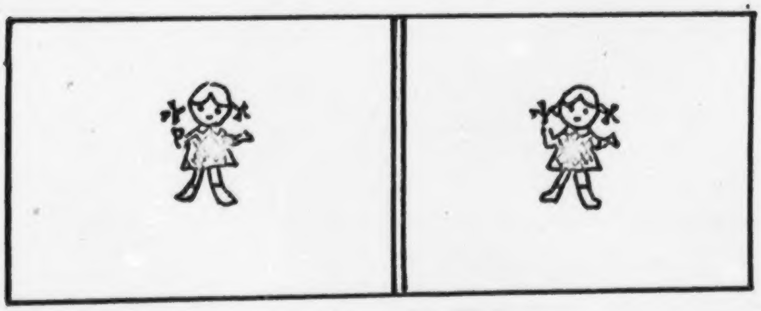
WORK SHEET II



1. ARE THE PICTURES THE SAME OR DIFFERENT? - the same
2. HOW ARE YOU GOING TO COLOR THE IDENTICAL PICTURES? - with the same color
   COLOR THEM.



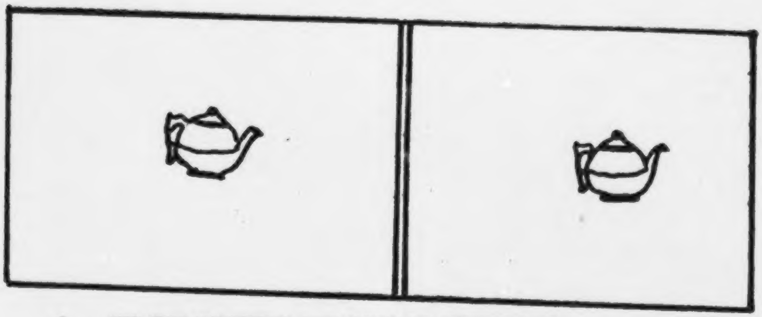
1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're different
2. HOW ARE YOU GOING TO COLOR DIFFERENT PICTURES? - with different colors
   COLOR THEM DIFFERENT COLORS.



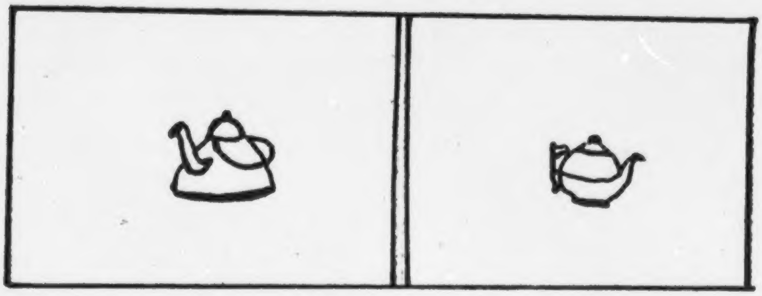
1. ARE THE PICTURES THE SAME OR DIFFERENT? - the same
2. HOW ARE YOU GOING TO COLOR THE IDENTICAL PICTURES? - with the same color
   COLOR THEM THE SAME COLOR.

Week III - 2
Lesson: Same - Different (7)

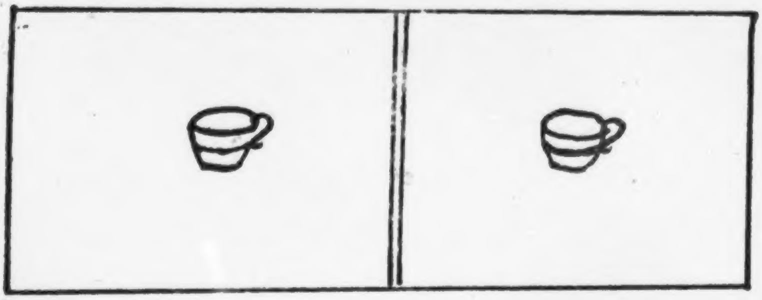
WORK SHEET III



1. ARE THE PICTURES THE SAME OR DIFFERENT? - the same
2. HOW ARE YOU GOING TO COLOR THE IDENTICAL PICTURES? - with the same color
   COLOR THEM.



1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're different
2. HOW ARE YOU GOING TO COLOR THE DIFFERENT PICTURES? - with different colors
   COLOR THEM.



1. ARE THE PICTURES THE SAME OR DIFFERENT? - the same
2. HOW ARE YOU GOING TO COLOR THE IDENTICAL PICTURES? - with the same color
   COLOR THEM.

Week III - 3

Lesson: Front - Back

INSTRUCTIONS

1. DO WHAT I DO.
(Swing your hands back and forth.)

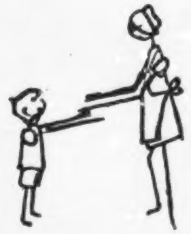
(hands in front)

(hands in back)

(hands in front)

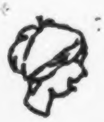
(hands in back)

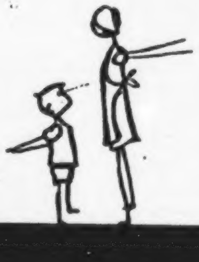
etc.



2. DO WHAT I DO.
(Say and do.)

(hands in front)	HANDS IN FRONT
(hands in back)	HANDS IN BACK
(hands in front)	HANDS IN FRONT
(hands in back)	HANDS IN BACK
(hands in front)	HANDS IN FRONT
(hands in back)	HANDS IN BACK





3. NOW LISTEN CAREFULLY? AND I'LL TELL YOU WHAT TO DO.
(Say without doing.)

HANDS IN FRONT

HANDS IN BACK

HANDS IN FRONT

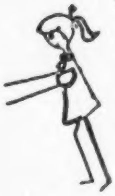
HANDS IN BACK

HANDS IN FRONT

HANDS IN BACK

HANDS IN BACK

(Each time the child does as he is told.)



4. NOW, TELL ME WHAT TO DO WITH MY HANDS.
FOR EXAMPLE, SAY, HANDS IN FRONT.

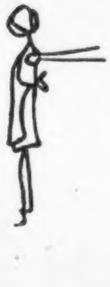
KEEP TELLING ME WHAT TO DO.

WHAT ELSE?

ONE MORE TIME.

ONCE MORE.

(Each time the mother does what the child tells her to do.)

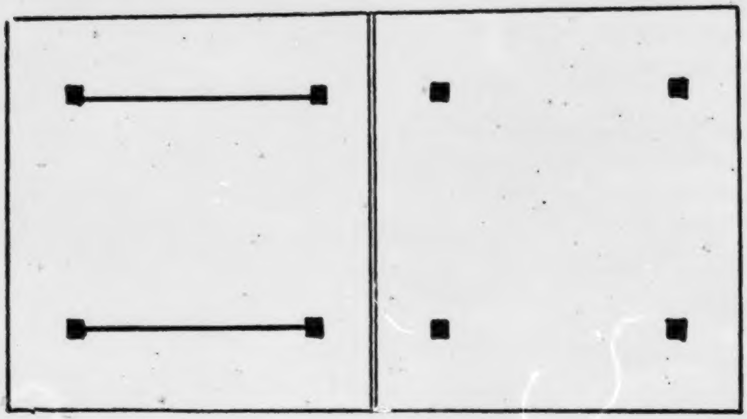


Week III - 3
Lesson: Connect the Dots (3)

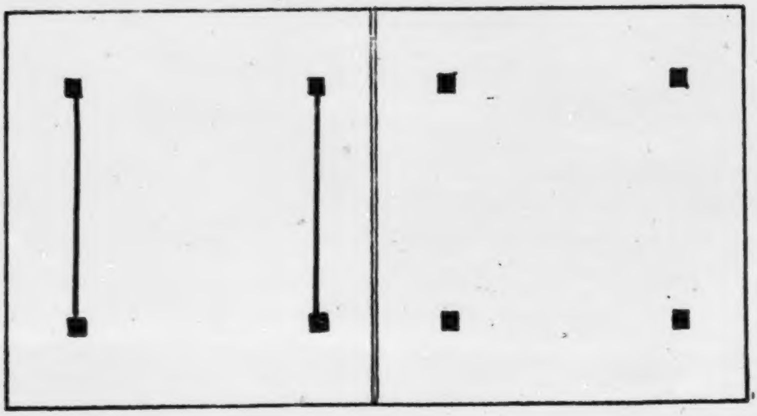
WORK SHEET I

(Place a match on each line.)

1. (Point to the empty box.)
2. (Say:) I'LL PUT ONE MATCH WHERE THE FIRST LINE SHOULD BE.
3. PUT THE SECOND MATCH WHERE THE SECOND LINE SHOULD BE.



1. PUT MATCHES ON THE LINES IN THE PICTURE.
2. ARRANGE MATCHES IN THE EMPTY BOX THE WAY THEY ARE IN THE PICTURE NEXT TO IT.

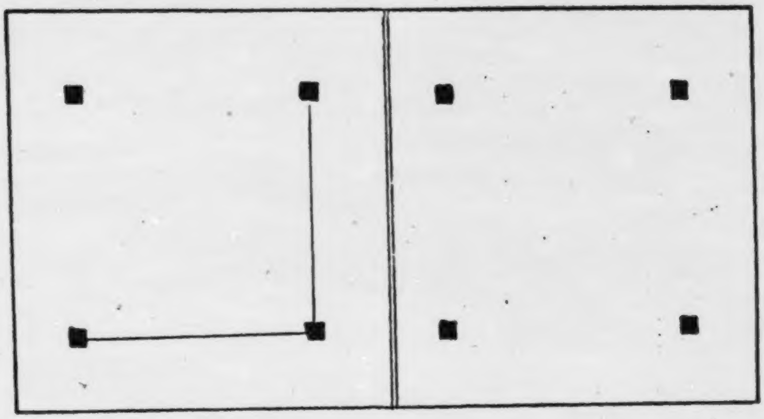


Week III - 3
Lesson: Connect the Dots (3)

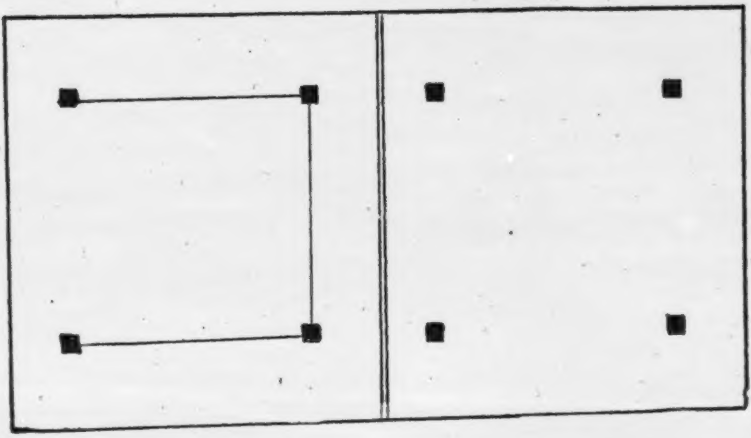
WORK SHEET II

(Place a match on each line.)

1. (Point to the empty box.)
2. (Say:) I'LL PUT ONE MATCH WHERE THE FIRST LINE SHOULD BE.
3. PUT THE SECOND MATCH WHERE THE SECOND LINE SHOULD BE.



1. PUT MATCHES ON THE LINES IN THE PICTURE.
2. ARRANGE MATCHES IN THE EMPTY BOX THE WAY THEY ARE IN THE PICTURE NEXT TO IT.



Week III - 3
Lesson: Connect the Dots (3)

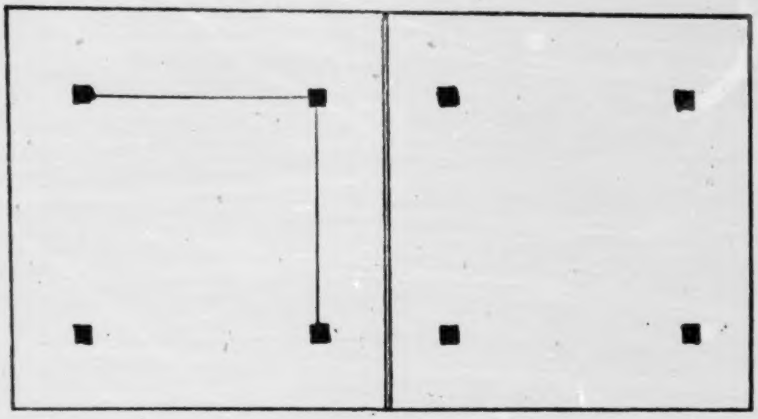
WORK SHEET III

(Place a match on each line.)

1. **(Point to the empty box.)**

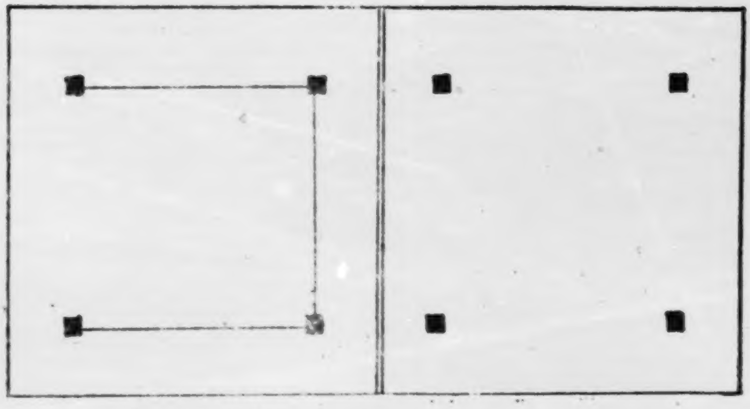
2. **(Say:) I'LL PUT ONE MATCH WHERE THE FIRST LINE SHOULD BE.**

3. **PUT THE SECOND MATCH WHERE THE SECOND LINE SHOULD BE.**



1. **PUT MATCHES ON THE LINES IN THE PICTURE.**

2. **ARRANGE MATCHES IN THE EMPTY BOX THE WAY THEY ARE IN THE PICTURE NEXT TO IT.**



Week III - 4

Lesson: Soft and Loud Sounds (1)

INSTRUCTIONS

1. **Materials:** A radio
(Turn on the radio.)

DO YOU HEAR SOUNDS?

2. (Turn off the radio.)

DO YOU HEAR SOUNDS NOW?

3. NOW I DON'T HEAR SOUNDS.
TURN ON THE RADIO. (Child turns on the radio.) NOW I HEAR SOUNDS.

4. (Turn up the radio very loudly and say:)
THIS IS A LOUD NOISE.
REPEAT AFTER ME: THIS IS A LOUD NOISE.

5. (Turn down the radio until it is playing very softly and say:)
THIS IS A SOFT SOUND.
REPEAT AFTER ME: THIS IS A SOFT SOUND.

6. (Say to your child:)
TURN UP THE RADIO UNTIL IT'S VERY LOUD.
WHAT SOUND DO YOU HEAR?

7. NOW MAKE IT VERY SOFT.
WHAT SOUND DO YOU HEAR?

8. (Turn up the radio until it's very loud and say:)
THIS IS A VERY LOUD SOUND. IT'S NOT PLEASANT TO HEAR.

9. (Turn the radio way down.)
THIS IS VERY SOFT. IT'S HARD TO HEAR THE RADIO. IT'S NOT PLEASANT TO HEAR EITHER.

10. (Turn the radio to a medium sound and say:)

THIS IS PLEASANT TO HEAR.
WHAT SOUND IS THIS?

11. I'LL TELL YOU WHICH WAY TO TURN THE DIAL.

TURN IT UP SO THAT IT'S LOUD.

TURN IT DOWN SO IT'S SOFT.

TURN IT UP AGAIN.

TURN IT TO A PLEASANT SOUND.

TURN IT DOWN SO IT'S SOFT.

TURN IT UP SO IT'S LOUD.

12. NOW CLOSE YOUR EYES AND LISTEN.

(Turn it up very loudly.)
WHAT SOUND DO YOU HEAR?

(Turn it way down.)
WHAT SOUND DO YOU HEAR?

(Turn it to a pleasant sound.)
WHAT DO YOU HEAR?

(Turn it way down.)
WHAT DO YOU HEAR?

(Turn it up very loudly.)
WHAT DO YOU HEAR?

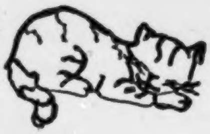
Week III - 5
Lesson: Matrix (2)

WORK SHEET I

1. I'LL TELL YOU WHERE TO POINT.
   SHOW ME THE CAT.
   SHOW ME THE DOG.
   SHOW ME THE BOY.
   SHOW ME THE GIRL.

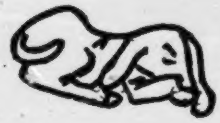
2. SHOW ME TWO ANIMALS.
   SHOW ME TWO CHILDREN.

3a. WHAT'S THE CAT DOING?



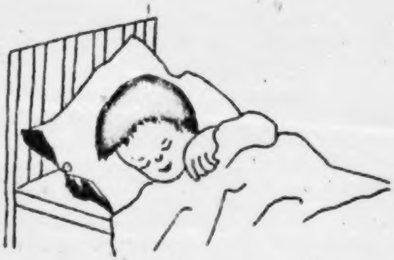
- The cat is sleeping.

3b. WHAT'S THE DOG DOING?



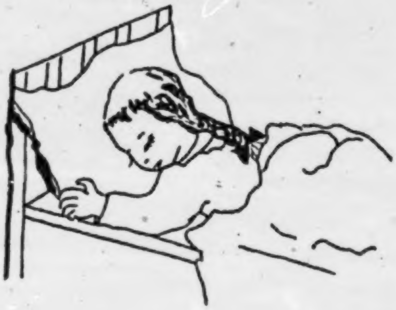
- The dog is sleeping.

3c. WHAT'S THE BOY DOING?



- The boy is sleeping.

3d. WHAT'S THE GIRL DOING?



- The girl is sleeping.

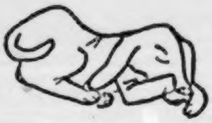
4. WHAT ARE THEY ALL DOING? - They are all sleeping.

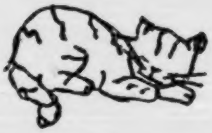
Week III - 5
Lesson: Matrix (2)

WORK SHEET II

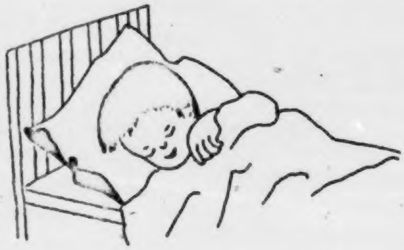
5. NOW I'LL TELL YOU WHAT TO DO.

a. TAKE THE BLUE CIRCLE.
WHAT DID YOU TAKE?
PUT IT ON THE DOG.

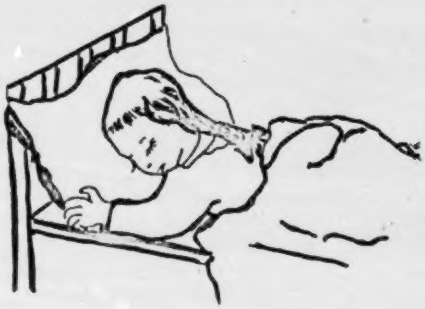




b. TAKE THE RED CIRCLE.
WHAT DID YOU TAKE.
PUT IT ON THE BOY.



c. TAKE THE YELLOW SQUARE.
WHAT DID YOU TAKE?
PUT IT ON THE GIRL.



6. WHERE DID YOU PUT THE BLUE CIRCLE?	- on the dog.
WHERE DID YOU PUT THE RED CIRCLE?	- on the boy.
WHERE DID YOU PUT THE YELLOW SQUARE?	- on the girl.
7. ON ONE PICTURE THERE IS NO MARKER. WHICH PICTURE IS IT?	- the picture of the cat.

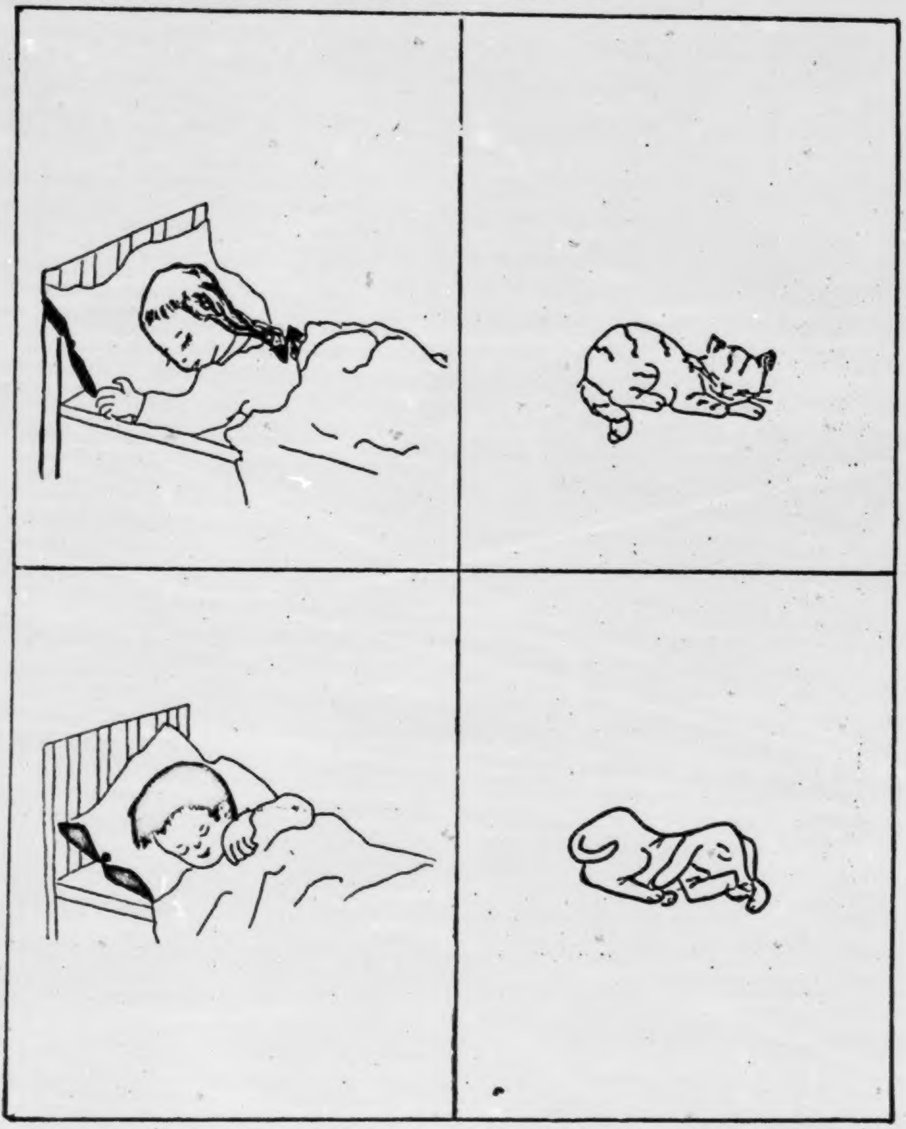
Week III - 5
Lesson: Matrix (2)

WORK SHEET III

(Remove all the markers from the previous page.)

8. HERE ARE 2 BLUE MARKERS. PUT THEM ON THE ANIMALS,

9. HERE ARE 2 RED MARKERS. PUT THEM ON THE CHILDREN.



10. WHERE DID YOU PUT THE BLUE MARKERS, ON THE CHILDREN OR ON THE ANIMALS?

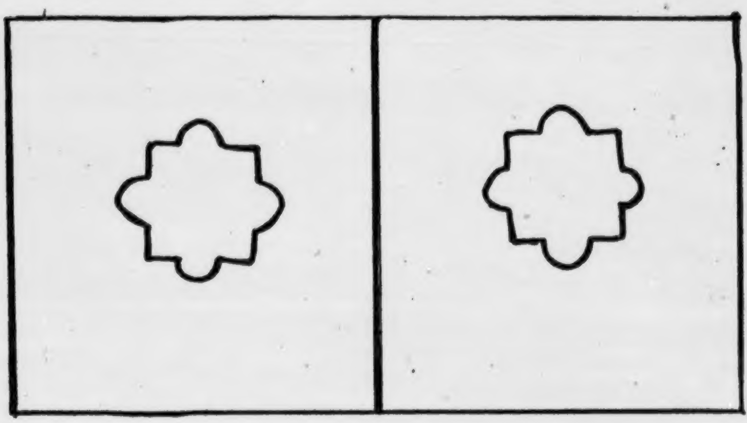
- on the animals.

11. WHERE DID YOU PUT THE RED MARKERS, ON THE CHILDREN OR ON THE ANIMALS?

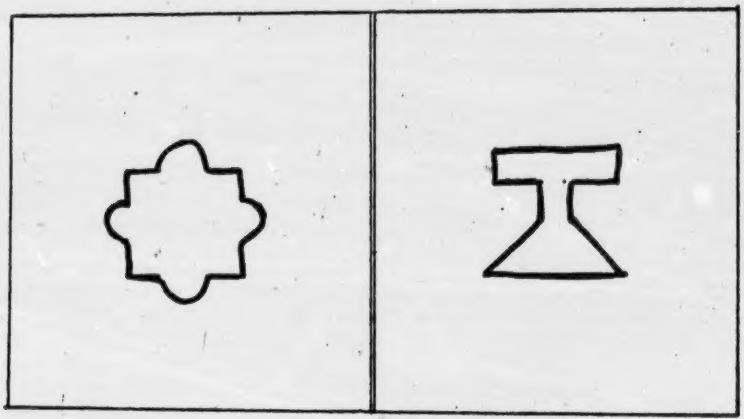
- on the children.

Week III - 5
Lesson: Same - Different (8)

WORK SHEET I



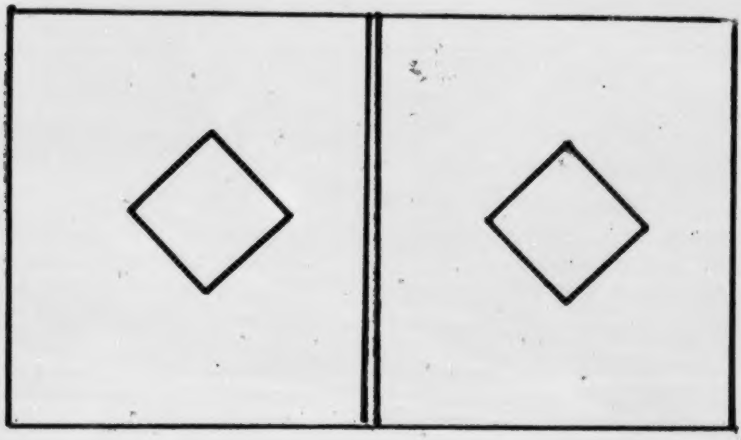
1. ARE THE PICTURES THE SAME OR DIFFERENT? - the same.
2. COLOR THEM THE SAME COLOR.



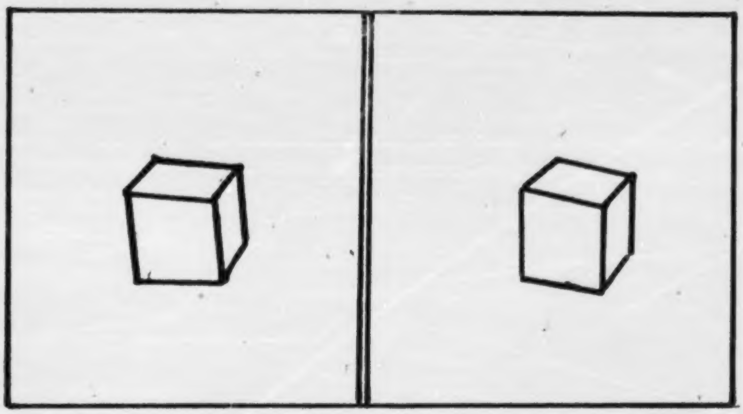
1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're different.
2. COLOR THEM DIFFERENT COLORS.

Week III - 5
Lesson: Same - Different (8)

WORK SHEET II



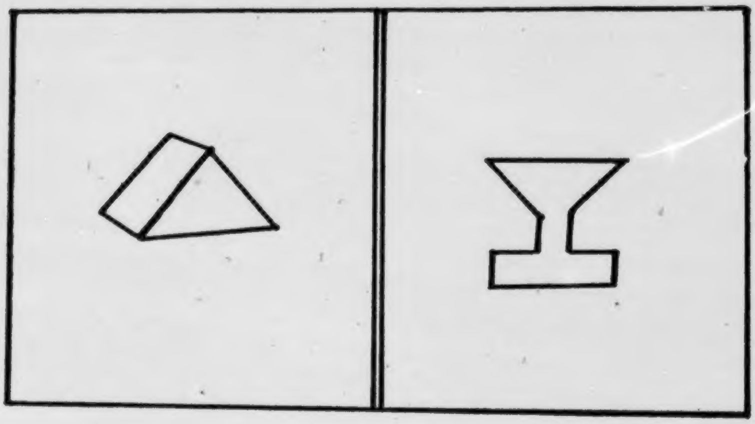
1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're the same.
2. COLOR THEM



1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're the same.
2. COLOR THEM

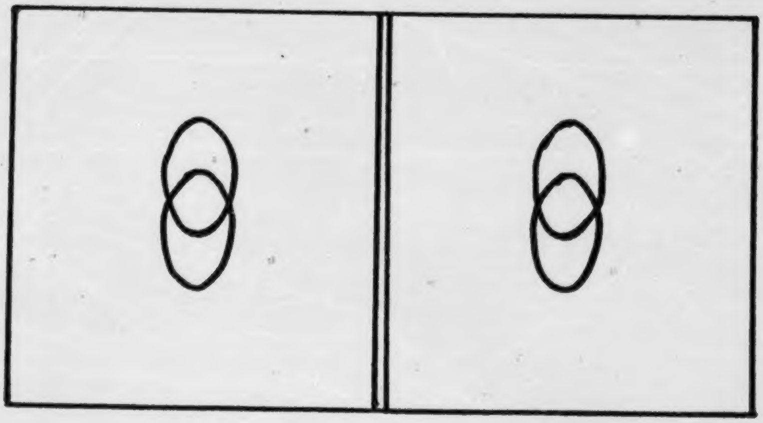
Week III - 5
Lesson: Same - Different (B)

WORK SHEET III



1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're different.

2. COLOR THEM



1. ARE THE PICTURES THE SAME OR DIFFERENT? - they're the same.

2. COLOR THEM

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